EXERCISE AND DIET MOTIVATION OF OVERWEIGHT WOMEN: AN APPLICATION OF THE THEORY OF PLANNED BEHAVIOR

By

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A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

2003

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ACKNOWLEDGMENTS

It is my desire to take this opportunity to express my appreciation and gratitude to the many people who have assisted me during this dissertation process. First and foremost, I would like to thank my advisor and mentor, Dr. Heather Hausenblas, for her support, encouragement, guidance, patience, and friendship. I know that the progress I have made is the result of the amount of time she has taken to answer “quick questions,” edit papers, listen to practice presentations, and prepare for job interviews. Without her, this document never would have been conceived. Second, I would like to thank my remaining committee members: Drs. Chris Janelle, Milledge Murphey, and Carolyn Tucker. I have been shaped by all of them and I hope to display aspects of each of their mentoring styles, research knowledge, and professional demeanor as I begin my career as a faculty member.

Third, I would like to acknowledge all of the individuals who helped me with program planning, recruiting participants, and collecting and entering data. First, I would like to thank Karla Pagan Shelnutt for her assistance in designing the diet. I admire her unselfishness and her willingness to help me when she was in the midst of preparing for her qualifying exams. Second, without the support and enthusiasm of Kelly Greeno and Mike Pullum from the YMCA, and Cher Harris and Ashley Mustard from the SRFC, this dissertation would not have been possible. These people were instrumental during this process, from giving me a place to conduct the weight-loss groups to allowing me to come into their “space” and work without distraction. I am also grateful to Patricia Linn for her incredible dedication to this project during the past year. Trish took work home with her, ran to the library to fetch references, sat in an uncomfortable chair for hours entering data, and gave up several weekends to code food logs. I am absolutely positive that without her help, I would still be entering data today!

Fourth, I would like to say thanks to my oldest and dearest friends (Debbie Cheaves, Dawn Smith, Andy Noble, Jason Karnes, and Laura Fox) who have supported me and kept me focused on the finish line, while reminding me of what is truly important in life. I thank Lori Gibbs and Gary Nave for being excellent people to work with. Their genuine interest in my life and my family has always been comforting. Also, I thank the friends I made while at the University of Florida for all of the wonderful memories ☺

Finally, I would like to thank my family for their continued love and support. I honestly believe that I have the greatest parents in the world, and I am forever grateful for all of the opportunities they afforded me over the years to reach my potential. I thank my brothers and sisters-in-law for keeping me grounded during this entire process. I would also like to thank my husband, Chris, for his devotion and support during my graduate career. The sacrifices he made so I could complete this project are too numerous to mention, but I know that I would not have finished without him. Finally, I would like to thank my son, Clayton, for being such a wonderful baby. I am grateful that he will probably have no memory of the amount of time I spent apart from him during this process. And despite the time away, he always welcomed me with a smile the next morning.

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Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Philosophy

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August 2003

Chair: Heather A. Hausenblas
Major Department: Exercise and Sport Sciences

Physical activity and maintaining a healthy body weight are associated with numerous physical and psychological benefits including a reduced risk of heart disease, cancer, depression, and anxiety. Despite these benefits, about 60% of American adults are not physically active and 64% are overweight and obese. Thus, there is a need for theoretical research on the determinants of exercise and diet behavior among individuals who are physically inactive, overweight, and obese. Therefore, the general objective of this dissertation was to examine the utility of the theory of planned behavior (TPB) for predicting overweight women's exercise and diet intention and behavior. Two studies were conducted to achieve this objective:

- Study 1 was an elicitation study using the TPB to examine the exercise and diet beliefs of overweight women and students who were participating in a 4-week weight-loss program.
- Study 2 was a prospective examination of overweight women's and students' exercise and diet intention and behavior during a 4-week weight-loss program using the TPB.

In Study 1, it was found that the most salient exercise beliefs for overweight women and students were (a) improving physical appearance and increasing motivation (behavioral beliefs), (b) family responsibilities and job or school responsibilities (control beliefs), and (c) program trainers and group members (normative beliefs). The most salient diet beliefs of overweight women and students were (a) improves eating habits (behavioral beliefs), (b) social situations and job or school responsibilities (control beliefs), and (c) program trainers and friends (normative beliefs). In Study 2, partial support was found for using the TPB to predict exercise and diet intention and behavior with overweight women and students. Specifically, perceived behavioral control emerged as the only significant determinant of exercise intention, whereas subjective norm and perceived behavioral control were significant predictors of diet intention. Furthermore, intention and perceived behavioral control failed to predict exercise behavior, but intention did emerge as a significant determinant of diet behavior with the overweight student participants. Implications of the results from both of the studies are discussed, in addition to the strengths and limitations of the dissertation studies, and recommendations for future research.

CHAPTER 1
INTRODUCTION

The adverse physical and psychological effects of physical inactivity, overweight, and obesity are well documented (United States Department of Health and Human Services [USDHHS], 2000). For example, several chronic illnesses including cardiovascular disease, certain types of cancer, type II diabetes, and all-cause mortality are linked to physical inactivity, overweight, and obesity (USDHHS). Moreover, several psychological benefits, such as decreased anxiety and depression and increased self-esteem and self-efficacy are associated with regular physical activity (USDHHS). The adoption of an active lifestyle and dietary modifications can prevent the damage caused by many of these physical and psychological illnesses (USDHHS).

Unfortunately, most of American adults are physically inactive and overweight, despite the numerous benefits associated with physical activity and maintaining a healthy weight (USDHHS, 2000). Currently, more than 60% of American adults are not regularly active, approximately 25% are sedentary, and 64% are overweight and obese (Flegal, Carroll, Ogden, & Johnson, 2002; USDHHS). In addition, low levels of physical activity and poor nutritional habits have contributed to 300,000 annual deaths from obesity-related disorders; second only to tobacco-related deaths (USDHHS). Finally, women, ethnic minorities, the less affluent, the less educated, and older persons are at a higher risk than other groups for low activity levels, sedentary lifestyles, and obesity (USDHHS).

Limited research has been undertaken to study the determinants of and adherence to exercise in these high-risk groups, and minimal research has investigated exercise and diet behaviors simultaneously. Before effective interventions can be implemented with these special populations, theoretical research must be conducted on the determinants of exercise and diet behavior. The theory of planned behavior (TPB; Ajzen, 1985, 1988, 1991) has been used frequently to investigate a variety of health behaviors including exercise and food choice. Thus, the purposes of this introduction are to (a) describe the TPB, (b) provide empirical support for the TPB from both reviews and research investigations of exercise and diet behavior, (c) highlight four limitations of the TPB, (d) discuss three areas for future research, and (e) briefly describe the two dissertation studies examining the TPB applied to exercise and diet intention and behavior.

The Theory of Planned Behavior: An Overview

The theory of reasoned action (TRA; Ajzen & Fishbein, 1980) is a popular theoretical approach used to investigate a variety of behaviors including exercise and diet. The TRA assumes that individuals consciously evaluate the consequences of their actions before they engage in a behavior. Thus, predicting and understanding an individual's behavior is the goal of the TRA (Ajzen & Fishbein). However, identification of the determinants of behavior is essential for prediction. The immediate determinant of behavior is intention or a person's level of motivation to engage in a behavior (Ajzen, 1991; Ajzen & Fishbein; see Figure 1-1). Intention, however, does not explain why an individual may or may not do what he or she intended to do (Ajzen & Fishbein).

Intention is determined by two conceptually independent constructs (attitude and subjective norm) and their respective underlying beliefs. Attitude refers to an individual's

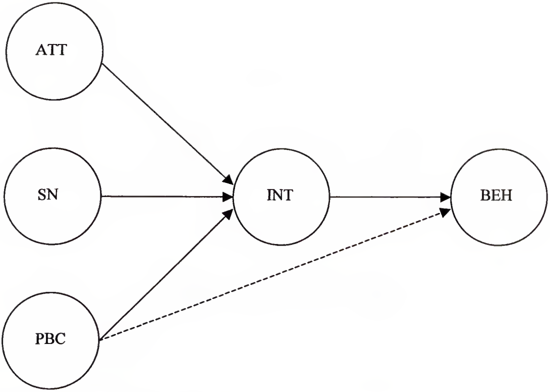

Figure 1-1. Conceptual model of the Theory of Planned Behavior. Solid arrows show the direct associations of attitude (ATT), subjective norm (SN), and perceived behavioral control (PBC) with intention (INT) and intention with behavior (BEH). The dashed arrow links perceived behavioral control directly to behavior. The dashed arrow is used because this association increases when volitional control decreases [Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50, 179-211].

positive or negative evaluation of the behavior and the consequences of performing the behavior (Ajzen, 1991). Ajzen proposed that attitude is represented by two separate components. That is, positive or negative feelings derived from performing the activity reflect affective attitude, whereas the perceived costs and benefits of participating in the activity define instrumental attitude. Finally, attitude is the function of behavioral beliefs. Behavioral beliefs are the product of the perceived consequences of performing a behavior and the positive or negative evaluation of the outcomes (Ajzen & Fishbein, 1980).

As the second determinant of intention, subjective norm reflects the perceived social pressure from others to engage in the behavior and the desire to conform to the expectations of others (Ajzen, 1991). Normative beliefs influence subjective norm and are the function of the following two components: the perceived pressure from important referents such as family, friends, and health-care providers, and the motivation to comply with the wishes of these influential others (Ajzen & Fishbein, 1980).

Unfortunately, the TRA does not successfully predict behaviors that are low in personal control (Ajzen, 1985). To control for the effects of nonvolitional behavior, Ajzen (1985, 1988, 1991) proposed the theory of planned behavior (TPB). Perceived behavioral control is the construct that distinguishes the TPB from the TRA, and it is a person's perception of the ease or difficulty they may experience when engaging in the behavior (Ajzen). Similar to attitude and subjective norm, underlying beliefs also account for perceived behavioral control. Control beliefs represent the factors that both facilitate and obstruct the performance of a behavior, such as personal skills, resources, and opportunities (Ajzen). In addition to indirectly predicting behavior through intention, perceived behavioral control also directly influences behavior, particularly as the level of control over the behavior decreases. Therefore, the basic hypotheses of the TPB are that (a) a person's intention to perform the behavior will be strong if she or he evaluates the behavior positively (i.e., attitude), if he or she perceives pressure from significant others to perform the behavior (i.e., subjective norm), and if her or his beliefs about the ease or difficulty of performing the behavior are strong (i.e., perceived behavioral control), and (b) a person is more likely to perform a behavior when his or her motivation is high (i.e., intention), and he or she perceives the behavior to be controllable (i.e., perceived behavioral control; Ajzen).

Theory of Planned Behavior Applied to Exercise and Diet

Specific Research Articles

The TPB has frequently been applied to study exercise behaviors. Thus, Courneya argued that the TPB is the "most validated model for understanding why people exercise" (Courneya & Bobick, 2000, p. 43). Researchers have examined a variety of populations:

- Cancer patients (Blanchard, Courneya, Rodgers, & Murnaghan, 2002; Courneya, Blanchard, & Laing, 2001; Courneya & Friedenreich, 1997, 1999; Courneya, Friedenreich, Arthur, & Bobick, 1999; Courneya, Keats, & Turner, 2000).
- Older persons (Brenes, Strube, & Storandt, 1998; Courneya, 1995; Courneya, Estabrooks, & Nigg, 1997; Courneya, Nigg, & Estabrooks, 1998; Estabrooks & Carron, 1998; Michels & Kugler, 1998).
- Coronary heart disease patients (Godin, Valois, Jobin, & Ross, 1991).
- Back pain sufferers (Trafimow & Trafimow, 1998).
- Smokers (Nguyen, Beland, Otis, & Potvin, 1996).
- College students (Ajzen & Driver, 1991, 1992; Bozionelos & Bennett, 1999; Bryan & Rocheleau, 2002; Courneya & Bobick, 2000; Courneya, Bobick, & Schinke, 1999; Dzewaltowski, Noble, & Shaw, 1990; Gatch & Kendzierski, 1990; Norman & Smith, 1995; Rhodes, Courneya, & Hayduk, 2002; Rhodes, Jones, & Courneya, 2002; Sheeran & Orbell, 2000; Terry & O'Leary, 1995; Yordy & Lent, 1993).
- Employees (Biddle, Goudas, & Page, 1994; Blue, Wilbur, & Marston-Scott, 2001; Chatzisarantis & Biddle, 1998; Godin & Gionet, 1991; Kerner & Grossman, 1998; Kimiecik, 1992; Smith & Biddle, 1999; Van Ryn, Lytle, & Kirscht, 1996).
- Pregnant and postpartum women (Godin, Valois, & Lepage, 1993; Godin, Vezina, & Leclerc, 1989; Hausenblas & Symons Downs, 2002; Symons Downs & Hausenblas, 2002b).
- Homemakers (Horne, 1994).
- Overweight women (Ellis Gardner & Hausenblas, in press).

- Members of a fitness center or fitness program (Kerner, Grossman, & Kurrant, 2001; Smith & Biddle, 1999; Theodorakis, 1994).
- Children and adolescents (Craig, Goldberg, & Dietz, 1996; Hagger, Chatzisarantis, & Biddle, 2001; Hagger, Chatzisarantis, Biddle, & Orbell, 2001; Mummery, Spence, & Hudec, 2000; Papaioannou & Theodorakis, 1996; Trost, Saunders, & Ward, 2002).
- A general population of adults (Courneya & McAuley, 1995a; Courneya, Plotnikoff, Hotz, & Birkett, 2000, 2001; Godin, Valois, & Lepage, 1993; Nguyen, Potvin, & Otis, 1997; Norman, Conner, & Bell, 2000; Smith & Biddle, 1999; Wankel & Mummery, 1993; Wankel, Mummery, Stephens, & Craig, 1994).

Generally, these studies have found that attitude and perceived behavioral control are consistent predictors of exercise intention, followed less consistently by subjective norm. For exercise behavior, it has been found that intention is the strongest determinant of exercise behavior, with perceived behavioral control producing mixed results (Hausenblas et al., 1997; Symons Downs & Hausenblas, 2002a). For example, an examination of the predictors of blue-collar workers' exercise intention and behavior revealed that perceived behavioral control and attitude had significantly large direct effects on intention, and subjective norm did not (Blue et al., 2001). Intention was found to be the dominant predictor of self-reported exercise behavior, and perceived behavioral control was also influential.

Courneya, Blanchard, and colleagues (2001) used a prospective design and an objective measure of exercise behavior to understand exercise motivation and behavior in a sample of breast cancer survivors. The researchers discovered that subjective norm and perceived behavioral control were significant determinants of breast cancer survivors' intention to attend an exercise class, and intention was the sole significant predictor of class attendance. These findings contrast an investigation of exercise behavior with breast and prostate cancer survivors (Blanchard et al., 2002). Using a cross-sectional design, Blanchard and colleagues found that intention and perceived behavioral control accounted for 30% and 36% of the variance in behavior among breast cancer and prostate cancer survivors, respectively. However, intention was the only construct to explain significant unique variance in self-reported exercise behavior. Regarding exercise intention, the determinants differed between samples. All three TPB constructs explained 45% of the variance in intention, and all three made significant unique contributions in the sample of breast cancer survivors. However, in the sample of prostate cancer survivors, 36% of the variance was explained in intention, but perceived behavioral control was the only determinant to make a significant unique contribution.

Similarly, the TPB is a popular framework to examine diet behaviors:

- The consumption of low-fat diets (Armitage & Arden, 2002; Armitage & Conner, 1999a, 1999b, 1999c; Conner, Sheeran, Norman, & Armitage, 2000; Liou & Contento, 2001; Lloyd, Paisley, & Mela, 1993; Nguyen, Otis, & Potvin, 1996; Povey, Conner, Sparks, James, & Shepherd, 2000a; Sparks & Guthrie, 1998; Sparks, Shepherd, Wieringa, & Zimmermanns, 1995).

- Eating healthy (Armitage, Conner, & Norman, 1999; Astrom & Rise, 2001; Conner, Norman, & Bell, 2002; Oygard & Rise, 1996; Povey, Conner, Sparks, James, & Shepherd, 2000b; Sparks, Guthrie, & Shepherd, 1997; Sparks et al., 1995).

- Dieting (Conner, Martin, Silverdale, & Grogan, 1996; Ellis Gardner & Hausenblas, in press).

- Food choice (Beale & Manstead, 1991; Berg, Jonsson, & Conner, 2000; Bissonnette & Contento, 2001; Dennison & Shepherd, 1995; Masalu & Astrom, 2001; Raats, Shepherd, & Sparks, 1993, 1995; Sparks, Conner, James, Shepherd, & Povey, 2001; Sparks, Guthrie, & Shepherd, 1997; Sparks, Hedderly, & Shepherd, 1992).

- Fruit and vegetable consumption (Lien, Lytle, & Komro, 2002; Povey et al., 2000a; Sparks & Shepherd, 1992).

Results are similar to findings from applications of the TPB with exercise behavior. That is, attitude and perceived behavioral control are the dominant predictors of intention, and intention and perceived behavioral control are the primary determinants of diet behavior

(Armitage & Conner, 2001). For example, Povey et al. (2000b) conducted a prospective investigation of the TPB examining the consumption of a healthy diet. Findings indicated that all three TPB constructs were significant in the prediction of intention ($\underline{R}^2 = .42$), and that intention and perceived behavioral control were significant determinants of self-reported behavior ($\underline{R}^2 = .15$) for a general population of men and women.

A prospective design was used to study eating a low-fat diet (Armitage & Conner, 1999b). For a general population of men and women, attitude and subjective norm were found to be the significant determinants of intention to eat a diet low in fat, and intention was the only significant predictor of behavior. Armitage and Conner (1999a) also prospectively examined eating a low-fat diet with male and female undergraduate students. The researchers used a self-report and an objective measure of eating behavior. Similar to the findings of Armitage and Conner (1999b), the same researchers (1999a) indicated that intention was the only significant determinant of behavior for both the self-reported and objective measures of behavior. All three TPB constructs (in addition to self-efficacy and self-identity) were significant predictors of intention to eat a low-fat diet and accounted for 65% of the total variance. Attitude and self-efficacy were the dominant predictors of intention, and subjective norm was more influential than perceived behavioral control for predicting intention.

Reviews

The usefulness of the TPB for predicting exercise and diet intention and behavior is supported in several narrative and statistical reviews that examined the TRA and TPB (Ajzen, 1991; Armitage & Conner, 2001; Biddle & Nigg, 2000; Blue, 1995; Carron, Hausenblas, & Estabrooks, 2003; Conner & Armitage, 1998; Conner & Sparks, 1996;

Culos-Reed, Gyurcsik, & Brawley, 2001; Ellis Gardner & Hausenblas, 2001; Godin, 1993, 1994; Godin & Kok, 1996; Godin & Shephard, 1990; Hagger, Chatzisarantis, & Biddle, 2002; Hausenblas et al., 1997; McAuley & Courneya, 1993; Notani, 1998; Shepherd, 1999; Sutton, 1998; Symons Downs & Hausenblas, 2002a). For example, Godin reviewed the TRA and TPB for predicting exercise intention and behavior. He reported that perceived behavioral control accounted for an additional 4% to 20% (M = 8%) of explained variance in the prediction of exercise intention. Similarly, Godin and Kok concluded that perceived behavioral control explained an additional 5% and 17.4% of variance beyond attitude and subjective norm in eating and exercise intention, respectively.

Meta-analytic reviews of the TRA and TPB with exercise and diet behaviors support the utility of the TPB (Armitage & Conner, 2001; Hausenblas et al., 1997; Symons Downs & Hausenblas, 2002a). In a review of exercise behaviors, Hausenblas and colleagues found large effect sizes between intention and attitude (ES = 1.22), intention and perceived behavioral control (ES = 0.97), behavior and intention (ES = 1.09), behavior and perceived behavioral control (ES = 1.01), and behavior and attitude (ES = 0.84). A moderate effect size was reported between intention and subjective norm (ES = 0.56), and no effect was evidenced between behavior and subjective norm. Similarly, Symons Downs and Hausenblas reported the intention-behavior (ES = 1.04), intention-attitude (ES = 1.06), and intention-perceived behavioral control (ES = 0.83) associations were large, and intention-subjective norm (ES = 0.59) and behavior-perceived behavioral control (ES = 0.52) relationships were moderate for exercise behavior. Additionally, multiple hierarchical regressions revealed that attitude and perceived behavioral control were significant determinants of exercise intention, and that exercise behavior was significantly predicted by intention.

Finally, Armitage and Conner (2001) conducted a meta-analytic review of 185 published studies using the TPB to examine a variety of behaviors including exercise and food choice. Across all behaviors, intention and perceived behavioral control accounted for 27% of the variance in behavior, with perceived behavioral control adding an additional 2% to the prediction of behavior. Attitude, subjective norm, and perceived behavioral control explained 39% of the variance in intention. However, the subjective norm-intention relationship was significantly weaker than the other associations, and perceived behavioral control independently accounted for 6% of the variance beyond attitude. Hausenblas and colleagues (1997), Symons Downs and Hausenblas (2002a), and Armitage and Conner concluded that there is strong evidence to support the utility of the TPB for predicting intention and behavior in the exercise and diet domain.

Limitations of the Theory of Planned Behavior

Elicitation Studies

Although research examining exercise and diet with the TPB is successful for predicting and explaining intention and behavior, four limitations must be mentioned. One limitation is the inconsistency of researchers to elicit salient beliefs regarding the target behavior. Ajzen and Fishbein (1980) and Ajzen (1985, 1988, 1991) recommended that researchers conduct an elicitation study with a smaller, representative group of the larger sample before assessing the TRA and TPB constructs. To determine a population's salient beliefs, Ajzen and Fishbein recommended that researchers (a) use open-ended questions assessing behavioral, normative, and control beliefs; (b) perform a content analysis (i.e., frequency counts) to rank-order the beliefs; and (c) determine the 5 to 10 most salient beliefs. This technique allows for the development of a belief-based questionnaire that is specific to the target group, and it can strengthen the predictive ability of the theories. Despite these recommendations, limited research has elicited the salient beliefs of participants before initiating the main study. Symons Downs and Hausenblas (2002a) reported that only 40 of 87 studies using the TPB and TRA to examine exercise behavior conducted elicitation studies. Furthermore, their findings indicated that a larger intention-behavior relationship and perceived behavioral control-behavior relationship exists in studies that included an elicitation study compared to those that did not.

Courneya and Friedenreich (1999) elicited the beliefs concerning exercise during cancer treatment of 24 breast cancer survivors. Participants were asked to identify the main advantages and disadvantages of exercising during treatment (i.e., behavioral beliefs), the main factors that prevented and helped them to exercise during their treatment (i.e., control beliefs), and the individuals or groups who were most important to them when they considered exercising during their cancer treatment (i.e., normative beliefs). The six most salient behavioral beliefs for the cancer survivors included (a) it gets my mind off cancer and my treatment, (b) it makes me feel better and improves my well-being, (c) it helps me maintain a normal lifestyle, (d) it helps me cope with the stress of cancer and treatment, (e) it helps me gain control over cancer and my life, and (f) it helps me control my weight. Six control beliefs were also elicited: (a) experienced nausea, (b) experienced fatigue or tiredness, (c) had no time to exercise, (d) had no support for exercise, (e) experienced pain or soreness, and (f) had to work at my regular job. Finally, five normative beliefs emerged for the cancer survivors: (a) spouse, (b) other family members, (c) friends, (d) physicians, and (e) other persons with cancer.

Using the same protocol as Coureneya and Friedenreich (1999), Symons Downs (2002) elicited the beliefs about exercising during pregnancy and after birth of 74 postpartum women. The behavioral advantages of exercising during pregnancy were (a) improves overall mood, (b) increases energy and stamina, (c) assists with staying fit, (d) controls weight, (e) assists in labor and delivery, and (f) provides stress relief. The behavioral advantages of exercising during postpartum were (a) controls weight, (b) assists with staying fit, (c) improves overall mood, (d) increases energy and stamina, (e) decreases physical comfort, and (f) provides stress relief. The behavioral disadvantages of exercising during pregnancy were (a) exercise causes physical discomfort, (b) tiredness and fatigue, and (c) time limits. The behavioral disadvantages of exercising during postpartum were (a) causes physical discomfort, (b) time limits, (c) tiredness and fatigue, and (d) difficulty with exercises.

The most salient control beliefs that prevented exercise during pregnancy were (a) physical limitations and restrictions, (b) tiredness and fatigue, (c) no time, (d) gaining weight, (e) other children, (f) fear, (g) bad weather, and (h) no motivation. For exercising during postpartum, the most salient control factors that obstructed exercise were (a) no time, (b) physical limitations and restrictions, (c) tiredness or fatigue, (d) fear, and (e) no motivation. The most common factors that helped women exercise during pregnancy were (a) improves overall mood, (b) controls weight, (c) motivation from others, (d) stay healthy, (e) other children, and (f) stay fit. Those beliefs that facilitated exercise during postpartum were (a) controls weight, (b) improves overall mood, (c) motivation from others, and (d) stay fit. Finally, the most important individuals or groups for women when they thought about exercising during pregnancy were (a) husband or fiancé, (b) children, (c) other family members, (d) friends, (e) doctors, (f) gym instructors, and (g) physical therapist. Similarly, for postpartum women (a) husband or fiancé, (b) family members, (c) other family members, (d) friends, (e) children, (f) doctors, (g) gym instructor, and (h) physical therapist were the most frequently identified normative beliefs. As indicated by the findings from these elicitation studies, the beliefs of special populations are unique and highlight the importance of eliciting the salient beliefs of target groups.

Operationalization and Measurement of Perceived Behavioral Control

A second limitation of the TPB research with exercise and diet is that the theories' constructs have often been operationalized and measured differently than proposed in the original theories (Ajzen & Fishbein, 1980; Ajzen, 1985, 1988, 1991). The most notable problem lies in the conceptualization of perceived behavioral control (Blue, 1995; Carron et al., 2003; Conner & Armitage, 1998; Godin & Kok, 1996; Symons Downs & Hausenblas, 2002a). Ajzen (1985, 1988, 1991) likened perceived behavioral control to self-efficacy and the perceived ease or difficulty of performing a behavior, still others measured it as perceived barriers (Godin & Gionet, 1991; Godin et al., 1991; Godin et al., 1993; Godin et al., 1989; Lien et al., 2002), perceived control (Biddle et al., 1994; Schifter & Ajzen, 1985; Sparks et al., 1997; Sparks et al., 1992; Povey et al., 2000a), and perceived difficulty (Sparks et al., 1997).

In attempts to disentangle perceived behavioral control from self-efficacy, researchers compared the two constructs to determine the better predictor of intention and behavior (Armitage & Conner, 1999a; Estabrooks & Carron, 1998). For example, Estabrooks and Carron prospectively examined attendance of an exercise class with a sample of male and female older adults (M age = 68 years). They compared perceived behavioral control, scheduling self-efficacy, and perceived barriers for predicting intention and behavior (i.e., class attendance). Overall, the findings indicated that scheduling self-efficacy was a better predictor of exercise behavior and intention than both perceived behavioral control and perceived barriers. Armitage and Conner also compared perceptions of control and self-efficacy in a prospective study of food choice. Although self-efficacy and perceived behavioral control were not found to be significant determinants of behavior, self-efficacy was the dominant predictor of intention to eat a low-fat diet.

In a meta-analytic review of the TPB and TRA and exercise behavior (Symons Downs & Hausenblas, 2002a), a significantly larger effect was observed for perceived behavioral control and behavior compared to the association between perceived barriers and behavior. In addition, it was found that the association between self-efficacy and intention was larger than the relationship between perceived barriers and intention. Similarly, a significantly larger effect was observed for perceived behavioral control and intention compared to perceived barriers and intention. No significant differences were observed between self-efficacy and perceived behavioral control in relation to either behavior or intention.

In light of the controversy surrounding perceived behavioral control, Ajzen (2002b) recently proposed that the measurement of this construct should include items that reflect both self-efficacy (i.e., the ease or difficulty of performing the behavior) and controllability (i.e., the beliefs about the extent to which the performance of the behavior is up to the individual). Trafimow, Sheeran, Conner, and Finlay (2002) provided support for this proposal in a series of studies in which they tested the concept of perceived behavioral control. Similar to Ajzen, they suggested that perceived behavioral control consist of the following two variables: perceived difficulty (i.e., the extent to which people consider the performance of a behavior to be easy or difficult), and perceived control (i.e., the extent to which people consider the performance of a behavior to be under their voluntary control).

Trafimow and colleagues (2002) also conducted a meta-analysis of 12 studies to determine whether perceived difficulty or perceived control was a better predictor of intention and behavior. Multiple regressions revealed that perceived difficulty was a stronger determinant than perceived control for both intention and behavior. The researchers concluded that perceived difficulty and perceived control are different constructs, and that it is important for measurement and prediction that a distinction is made between the two. More research is warranted with these constructs, but it is clear that the measurement issues concerning perceived behavioral control must be addressed in future research using the TPB (Ajzen, 2002; Carron et al., 2003; Culos-Reed et al., 2001; Symons Downs & Hausenblas, 2002a).

Operationalization and Measurement of Subjective Norm

Third, the role of subjective norm in the prediction of exercise and diet behavior has been questioned because of its weak relationship with intention (Carron et al., 2003; Courneya & McAuley, 1995b; Culos-Reed et al., 2001; Hausenblas et al., 1997; Symons Downs & Hausenblas, 2002a). Culos-Reed and colleagues argued that subjective norm might be a weak predictor of exercise intention (and likewise diet intention) because it represents perceived social pressure from significant others to perform the behavior and the motivation to comply with the expectations of those individuals or groups. This social pressure may not be as important for exercise and diet behavior as it is for other health behaviors such as contraceptive use. As a result, some researchers suggested that social support may be a better predictor of exercise and diet behavior because it reflects the support and encouragement individuals receive from important others when they perform these behaviors (Courneya, Plotnikoff, et al., 2000; Horne, 1994; Rhodes, Jones, et al., 2002). For example, Courneya, Plotnikoff, and colleagues compared social support and subjective norm within the framework of the TPB for predicting exercise intention and current exercise stage in a sample of the general population. Their findings indicated that social support was a superior predictor of both intention and exercise stage compared to the TPB construct of subjective norm. Further support for the inclusion of social support in the TPB was provided by a prospective examination of exercise behavior in male and female undergraduate students (Rhodes, Jones, et al.). Social support was a significant determinant of exercise intention and behavior, whereas subjective norm was not.

A second possible reason for the weak predictive power of subjective norm is the use of one item to assess the construct (Armitage & Conner, 2001). In a meta-analytic review of 185 TPB studies, multiple-item measures of subjective norm had significantly stronger correlations with intention than single-item measures. This finding indicates that subjective norm's inconsistent prediction of intention may be a measurement issue.

Scale Correspondence

Finally, lack of scale correspondence is a fourth limitation of the TPB research. For intention to accurately predict behavior, there must be correspondence between the two constructs regarding the elements of action, target, context, and time (Ajzen & Fishbein, 1980; Courneya, 1994; Courneya & McAuley, 1993b, 1994). Action is the behavior of interest (e.g., exercise or diet); target refers to the purpose of the behavior (e.g., to control weight); context is the location of the performance of the behavior (e.g., fitness center, home, with a group, etc.); and time is when the behavior will be performed (e.g., morning, evening, during the next week, over the next 4 weeks, etc.). A lack of scale correspondence occurs when different magnitudes, frequencies, or response formats are established to measure intention and behavior (Courneya; Courneya & McAuley). Courneya and McAuley identified five scales used to assess these two constructs:

- Continuous-open (e.g., "I intend to engage in physical activity ___ times during the next month").
- Continuous-closed numerical (e.g., "I intend to engage in physical activity during the next month the following number of times": 1 [0-4], 2 [5-9], 3 [10-14], 4 [15-19], 5 [20-24], 6 [25-29], 7 [30+]).
- Continuous-closed verbal (e.g., "I intend to engage in physical activity during the next month with the following regularity": 1 [not at all] to 7 [everyday]).
- Dichotomous-yes/no (e.g., "I do ___ do not ___ intend to engage in physical activity during the next month").
- Dichotomous-graded (e.g., "I intend to engage in physical activity during the next month": 1 [definitely] to 7 [definitely not]).

Much of the research examining exercise and diet behavior lacks scale correspondence. For example, Courneya and McAuley (1993b) reported that only one study focusing on physical activity obtained scale correspondence. The most common violation of scale correspondence occurs when a dichotomous-graded scale is used to measure intention and a continuous-open scale is used to assess behavior. Symons Downs and Hausenblas (2002a) reported that 82.5% of the studies included in their meta-analytic review of the TRA and TPB with exercise did not have scale correspondence. Similarly, in a narrative review of 24 studies of the TPB with exercise and diet, only four achieved scale correspondence (Ellis Gardner & Hausenblas, 2001). Furthermore, a lack of scale correspondence may violate the theoretical assumptions of the TPB and result in inconsistent predictions between the TPB constructs and behavior. For instance, Symons Downs and Hausenblas found significantly larger intention-behavior relationships for studies with scale correspondence (ES = 1.57) compared to studies that did not achieve scale correspondence (ES = 0.90). To insure strong associations between the constructs, Courneya (1994) recommended that researchers use the continuous-open or continuous-closed numerical response formats to measure intention and behavior.

Future Directions

The TPB is a popular and useful framework to predict and understand exercise and diet behavior. However, future research with this model should address the following three areas. First, much of the research using the TPB for exercise and diet behavior relied on self-reported measures. For example, in a narrative review of 29 applications of the TPB with exercise and diet, 23 used self-report measures of behavior (Ellis Gardner & Hausenblas, 2001). Symons Downs and Hausenblas (2002a) reported that 86% of the TRA and TPB studies they reviewed also used a self-report measure of exercise behavior. Furthermore, in a meta-analytic review of 185 published studies using the TPB (Armitage & Conner, 2001), it was found that intention and perceived behavioral control accounted for a greater proportion of variance with prospective measures of self-reported behavior ($\underline{R}^2 = .31$) than with objective measures of behavior ($\underline{R}^2 = .20$). Although the TPB constructs were better predicted by self-reported data, the amount of explained variance for objective data produced a medium-large effect, and this provides further evidence for the predictive utility of this model (Armitage & Conner).

Second, future research using the TPB with exercise and diet should also address the needs of high-risk populations for physical inactivity, overweight, and obesity. To assess the determinants of and adherence to these behaviors, more research needs to be conducted that targets women, ethnic minorities, the less educated, the less affluent, and older persons. Unfortunately, researchers applying the TPB to these behaviors have failed to target these groups. For instance, Symons Downs and Hausenblas (2002a) reported that only 22.9% of TPB studies examined exercise behavior with at-risk populations. Similarly, of 35 studies applying the TPB to exercise and diet behavior, only 8 studies (e.g., 5 with women, 3 with older persons) targeted special populations (Ellis Gardner & Hausenblas, 2001). No studies located in the narrative review were designed to examine exercise or diet behavior among ethnic minorities, the less educated, or the less affluent (Ellis Gardner & Hausenblas). To better understand determinants of exercise and diet particular to these groups, researchers should target at-risk populations for physical inactivity, overweight, and obesity.

A final avenue for future research with the TPB is the simultaneous examination of multiple related behaviors. The Surgeon General (USDHHS, 2000) argued that a lack of physical activity and poor dietary habits contributed to the rise in chronic illness, including obesity; yet limited research has investigated exercise and diet simultaneously using the TPB (Bagozzi & Kimmel, 1995; Ellis Gardner & Hausenblas, in press; Nguyen, et al., 1996; Rodgers & Brawley, 1993). Similarly, few investigations of weight-loss and weight control have been conducted (Conner & Norman, 1996; Netemeyer, Burton, &

Johnston, 1991; Schifter & Ajzen, 1985). Research using the TPB to simultaneously examine exercise and diet behavior is warranted, given the rise in physical inactivity, overweight, and obesity in the United States (USDHHS).

Summary

In summary, the TPB has emerged as one of the most validated models to study exercise and diet behavior (Armitage & Conner, 2001; Hausenblas et al., 1997; Symons Downs & Hausenblas, 2002a). Although attitude and perceived behavioral control are consistent predictors of intention, and intention and perceived behavioral control are strong determinants of behavior, several theoretical limitations must be considered when interpreting the results of the TPB research with exercise and diet. The following four limitations have been identified: (a) the lack of elicitation studies, (b) operationalization and measurement of perceived behavioral control, (c) operationalization and measurement of subjective norm, and (d) a lack of scale correspondence between the response formats of intention and behavior. Future research with the TPB should address these limitations. In addition, it is recommended that researchers use objective measures of behavior, examine the determinants of exercise and diet behavior and intention in special populations, and study exercise and diet behaviors simultaneously. This research can help guide intervention development and implementation based on the conceptual framework of the TPB for promoting exercise and diet in healthy and special populations.

Purpose of the Dissertation

The general objective of this dissertation was to examine the utility of the TPB for predicting, explaining, and understanding overweight women's exercise and diet intention and behavior during a weight-loss intervention. Two studies were conducted to achieve this objective. The following section provides a brief summary of each study.

First, an elicitation study (Chapter 2) was conducted in an effort to adhere to the theory guidelines established by Ajzen and Fishbein (1980). Given the limited TPB research examining multiple health behaviors, the lack of research with at-risk populations for physical inactivity and overweight, and the lack of elicitation studies in the literature, a retrospective investigation of overweight women's exercise and diet beliefs was conducted. The main purpose of this study was to determine the frequency of overweight women's behavioral, normative, and control exercise and diet beliefs during a weight-loss intervention. The salient beliefs of this population are discussed, and the salient beliefs are also used to develop the belief-based instrument included in the prospective examination of the TPB constructs for predicting exercise and diet intention and behavior with overweight women (Chapter 3).

The second study of this dissertation was a 4-week prospective study of the TPB constructs and exercising and dieting during a weight-loss intervention (Chapter 3). It is important to examine the determinants of exercise and diet behaviors with populations at risk of physical inactivity, overweight, and obesity to develop and implement effective interventions. Therefore, the general purpose of the second study was to prospectively examine the utility of the TPB as a theoretical framework for predicting overweight women's exercise and diet intention and behavior during a weight-loss intervention. The findings from repeated measures analyses of variance (ANOVA), correlations, and multiple hierarchical regression analyses (HRA) are discussed.

CHAPTER 2

STUDY1: EXERCISE AND DIET BELIEFS OF OVERWEIGHT WOMEN: AN ELICITATION STUDY USING THE THEORY OF PLANNED BEHAVIOR

Physical inactivity, overweight, and obesity are risk factors for several chronic illnesses including cardiovascular disease, certain types of cancer, hypertension, type II diabetes, as well as all-cause mortality, and they can negatively effect psychological health (United States Department of Health and Human Services [USDHHS], 2000). Unfortunately, more than 60% of American adults are not regularly physically active, 25% are sedentary, and 64% are overweight and obese (Flegal, Carroll, Ogden, & Johnson, 2002; USDHHS). Thus, physical inactivity, overweight, and obesity are major health concerns in the United States. Another concern is the disparity in physical activity levels and obesity among certain populations. For example, women, ethnic minorities, the less affluent, the less educated, and older persons are more at-risk for sedentary behavior and obesity (USDHHS); however, limited theoretical research has been conducted to examine exercise and diet behavior among these high-risk populations. Therefore, it is imperative that theoretical research on the determinants of these behaviors be undertaken to design effective exercise and diet interventions with special populations.

A theoretical approach that has been used extensively to examine exercise and diet behavior is Ajzen's (1985, 1988, 1991) theory of planned behavior (TPB). The TPB is an extension of Ajzen and Fishbein's (1980) theory of reasoned action (TRA), and it retains three of the original variables (i.e., intention, attitude, subjective norm), and adds a fourth variable labeled perceived behavioral control. Intention represents an individual's current level of motivation and effort to perform a behavior, and it is the central determinant of behavior (Ajzen; Ajzen & Fishbein). Intention, in turn, is predicted by the following three conceptually independent constructs: attitude, subjective norm, and perceived behavioral control (Ajzen). Attitude is the individual's positive or negative evaluation of a behavior, and it is often represented by instrumental and affective attitude. Instrumental attitude reflects the costs versus benefits analysis of performing a behavior, whereas affective attitude is conceptualized as the positive or negative feelings about a behavior. Subjective norm is the perceived social pressure from important others to perform a behavior. Finally, due to the TRA's lack of success in predicting behaviors that are low in personal control, perceived behavioral control was added to the model to control for the effects of nonvolitional behavior (Ajzen). Perceived behavioral control is the perception of the ease or difficulty of performing a behavior. In addition to indirectly predicting behavior through intention, perceived behavioral control is also a direct determinant of behavior. The relationship between perceived behavioral control and behavior strengthens as volitional control decreases. Thus, the TPB postulates that a person is more likely to engage in a behavior (a) when his or her intention to perform the behavior and perceptions of control are strong, and (b) when she or he holds a positive attitude, favorable subjective norm, and high perceptions of control (Ajzen).

Support of the TPB for predicting exercise and diet intention and behavior is strong (Ajzen, 1991; Godin & Kok, 1996; Hausenblas, Carron, & Mack, 1997; Symons Downs & Hausenblas, 2002a). For example, Godin and Kok reviewed the TPB's application to health-related behaviors. Specifically for the prediction of exercise behavior, intention ($r = .52$) was stronger than perceived behavioral control ($r = .41$); and for the prediction of exercise intention, attitude ($r = .51$) was stronger than perceived behavioral control ($r = .50$). Only eating intention could be examined in Godin and Kok's review, and similar to exercise intention, attitude ($r = .34$) was stronger than perceived behavioral control ($r = .32$). Overall, the researchers concluded that intention is the most important determinant of health behaviors followed by perceived behavioral control, and that perceived behavioral control is equal in predictive ability with attitude for health intention. Hausenblas et al. and Symons Downs and Hausenblas reported similar conclusions in their meta-analytic reviews with exercise behavior comparing the TPB and TRA. Large effect sizes were found between intention-attitude, intention-perceived behavioral control, behavior-intention, and behavior-perceived behavioral control. Thus, these researchers concluded that the TPB is a useful framework for predicting and explaining exercise behavior.

The TPB also accounts for the underlying beliefs that explain attitude, subjective norm, and perceived behavioral control (Ajzen, 1991). Attitude is a function of *behavioral beliefs*, which refer to the perceived advantages and disadvantages of performing a behavior, as well as evaluations of potential outcomes. Thus, an individual can develop strong feelings about a behavior if he or she believes there are advantages to performing the behavior and if he or she expects a favorable outcome. Subjective norm is determined by *normative beliefs*, which center on whether specific individuals or groups who are important to the person think he or she should perform a behavior, and his or her motivation to comply with those important others. For instance, a person is more likely to perceive social pressure to perform a behavior if he or she believes important others want him or her to perform the behavior and feels obligated to comply with the expectations of others. Finally, control beliefs are antecedents of perceived behavioral control, and are based on opportunities, available resources, potential obstacles, and past experience with a particular activity, and the perceived power of these beliefs. If the individual believes he or she possesses more resources, has more opportunities, and will encounter fewer obstacles when performing a behavior, the person's perception of control over the behavior will be strong. A strength of the TPB is that an elicitation study forms the basis of instrument development and allows the participants to determine their salient beliefs concerning a behavior. The grounding of the instrument in data increases content validity and insures its appropriateness for a specific population (Ajzen).

Unfortunately, few researchers examining exercise and diet behavior have followed the guidelines proposed by Ajzen and Fishbein (1980) because they have not conducted elicitation studies to examine exercise and diet beliefs. In a meta-analytic review of 87 studies that applied the TRA and TPB to exercise, it was found that only 46% of the studies conducted an elicitation study (Symons Downs & Hausenblas, 2002a). Similarly, in a review of 34 studies that examined exercise and diet behaviors using the TPB, only 12 studies conducted elicitation studies before initiating the main study (Ellis Gardner & Hausenblas, 2001). Failure to conduct elicitation studies undermines the predictive ability of the TPB. For example, Symons Downs and Hausenblas reported significantly larger effect sizes (ES) between intention-behavior (ES = 1.32 vs. ES = 0.86) and perceived behavioral control-behavior (ES = 0.78 vs. ES = 0.34) in studies applying the TRA and TPB that included elicitation studies compared to those that did not.

Therefore, the main purpose of this study was to elicit the salient behavioral, normative, and control beliefs of overweight women following the guidelines established by Ajzen and Fishbein (1980). Two samples of women were used for this purpose. Sample one included a group of overweight adult women from a private fitness center, and sample two was a group of overweight female students from a large southeastern university. Both groups were participating in a 4-week weight-loss program. The two samples of overweight women were chosen for the study to illustrate the importance of conducting elicitation studies with different populations. Salient beliefs for normal and special populations are different (Carron, Hausenblas, & Estabrooks, 2002; Symons Downs & Hausenblas, 2002a); therefore no specific hypotheses were generated for the beliefs. However, it was expected that the two samples of overweight women would report different exercise and diet beliefs. The results of this elicitation study enabled the development of a belief-based questionnaire to examine the predictive ability of the TPB to prospectively determine the predictors of exercise and diet behavior with overweight populations.

A secondary purpose of this study was to determine the effectiveness of the intervention for improving participants' weight and body composition. It was expected that the measurements of body mass index, percent body fat, and circumferences would decrease from pre to postprogram (Ellis Gardner & Hausenblas, in press).

Method

Participants

Sample one. Participants were 23 overweight and obese women between the ages of 30 and 57 (M = 44.55, SD = 8.11). Most of the participants were Caucasian (n = 20), followed equally by African American or Black (n = 1), Asian (n = 1), and Hispanic or Latino (n = 1). About 82.6% of the women were married (n = 19), 73.9% had at least a college education (n = 17), and 69.6% earned an annual household income of at least $40,000 (n = 16; see Table 2-1 for frequencies). Finally, the average weight, body mass index, and percent body fat of the participants at the beginning of the 4-week program was 173.77 pounds, 29.22, and 31.10%, respectively (see Table 2-2 for M and SD scores).

Sample two. Participants were 33 overweight and obese female university students between the ages of 18 and 36 (M age = 21.70, SD = 4.04). Most of the women were Caucasian (n = 14), followed by African American or Black (n = 8), Hispanic or Latino (n = 6), and Asian or Pacific Islander (n = 4). About 78.8% had completed some university or college (n = 26), 84.8% were single or never married (n = 28), 48.5% reported an annual family income of less than $20,000 (n = 16), and 54.5% were employed part-time (n = 18; see Table 2-3 for frequencies). Finally, preprogram assessments of weight, body mass index, and percent body fat were 173.53 pounds, 29.30, and 32.51%, respectively (see Table 2-4 for M and SD scores).

Measures

Body mass index (BMI). BMI was determined from a direct measure of weight and self-reported height. It is calculated by dividing body weight by height squared (kg/m^2). A BMI of 25.0 to 29.9 kg/m^2 is overweight, and a BMI greater than 29.9 kg/m^2 is obese (American College of Sports Medicine [ACSM], 2000). The BMI is a reliable estimate of obesity (Garrow & Webster, 1985), however, there is a standard error of ±5% when using BMI to estimate body fat percentage (ACSM).

Table 2-1

Demographic Profile of the Participants in Sample One

Characteristic	N	%
Ethnic Background		
African American/Black	1	4.3
Asian	1	4.3
Caucasian	20	87.0
Hispanic/Latino	1	4.3
Highest Level of Education		
High school	5	21.7
College	11	47.8
Trade	1	4.3
Graduate	6	26.1
Marital Status		
Single	1	4.3
Married	19	82.6
Divorced	2	8.7
Unknown	1	4.3
Annual Family Income		
$10,000-$20,000	1	4.3
$20,000-$40,000	4	17.4
$40,000-$100,000	13	56.5
More than $100,000	3	13.0
Unknown	2	8.7
Occupation		
Business	5	21.7
Budget analyst	1	
Consultant	1	
CPA	1	
Manager	2	
Education	1	4.3
Teacher/professor	1	
Medicine/Science	7	30.4
Aquatic biologist	1	
Biochemist	1	
Biologist	1	
Lab technician	1	
Nurse	3	
Other	7	30.4
Home/housewife	2	
Nurserymen	1	
Real estate assistant	1	

Table 2-1. Continued

Characteristic	N	%
Retired	1	
Self-employed	2	
Unknown	3	13.0

Table 2-2

Mean (M) and Standard Deviation (SD) Scores of the Demographic Characteristics and the Leisure-Time Exercise Questionnaire for the Participants in Sample One

Variable	M	SD
Age	44.55	8.11
Height	64.61	2.08
Weight	173.77	33.65
Body Mass Index	29.22	4.92
Percent Body Fat	31.10	4.24
Waist	36.36	4.99
Hip	42.39	3.83
Percentage of Body Weight Lost (pre-post)	4.45	2.50
Leisure-Time Exercise Questionnaire Total	39.93	24.81
Strenuous	18.00	17.01
Moderate	12.83	8.86
Mild	9.10	8.11

Note. Height and circumference measurements reported in inches. Weight and body composition measurements represent preprogram measurements.

Table 2-3
Demographic Profile of the Participants in Sample Two

Characteristic	N	%
Ethnic Background		
African American/Black	8	24.2
Asian/Pacific Islander	4	12.1
Caucasian	14	42.4
Hispanic/Latino	6	18.2
Other	1	3.0
Highest Level of Education		
Some university/college	26	78.8
Completed university/college	1	3.0
Some graduate/professional school	6	18.2
Marital Status		
Single/never married	28	84.8
Engaged	2	6.1
Married	2	6.1
Common law	1	3.0
Annual Family Income		
Less than $20,000	16	48.5
$20,000-$39,000	2	6.1
$40,000-$59,000	5	15.2
$60,000-$79,000	2	6.1
More than $80,000	5	15.2
Unknown	3	9.1
Employment Status		
Unemployed	9	27.3
Part-time	18	54.5
Full-time	1	3.0
Other	5	15.2
Number of Children		
None	32	97.0
1-2 children	1	3.0
Number of Days Participants Weigh Themselves During Average Week		
None	18	54.5
1-2 days	8	24.2
3-4 days	2	6.1
5-6 days	3	9.1
7 days	2	6.1
Number of Weight Loss Attempts During Past 6 Months		
None	6	18.2

Table 2-3. Continued

Characteristic	N	%
1-3 attempts	21	63.6
4-6 attempts	4	12.1
7-9 attempts	1	3.0
10 or more	1	3.0
Pounds Lost During Most Recent Weight Loss Attempt		
Not applicable	6	18.2
None	5	15.2
1-4 pounds	4	12.1
5-9 pounds	8	24.2
10 or more pounds	10	30.3

Table 2-4

Mean (M) and Standard Deviation (SD) Scores of the Demographic Characteristics and the Leisure-Time Exercise Questionnaire for the Participants in Sample Two

Variable	M	SD
Age	21.70	4.04
Height	64.89	2.66
Weight	173.53	36.88
Body Mass Index	29.30	6.00
Percent Body Fat	32.51	4.42
Waist	34.90	4.58
Hip	42.14	4.66
Percentage of Body Weight Lost (pre-post)	1.44	1.58
Leisure-Time Exercise Questionnaire Total	37.73	22.38
Strenuous	17.73	17.35
Moderate	12.27	10.32
Mild	7.73	7.31

Note. Height and circumferences recorded in inches. Strenuous, moderate, and mild exercise reported in metabolic equivalents. Weight and body composition measurements represent preprogram measurements.

Percent body fat. Body fat percentage was assessed with Lange skinfold calipers using the three-site technique of the triceps, suprailiac, and thigh (Jackson & Pollack, 1985). Skinfold measurements are correlated with body composition results from hydrostatic weighing (ACSM, 2000). However, assuming proper techniques and formulas have been used, there remains a ±3.5% margin of error when predicting percent body fat from skinfolds (ACSM). The recommended standard of percent body fat for women is 15% to 25% because of the low risk of disease associated with this range (Powers & Dodd, 2003).

Circumference measures. Waist and hip circumferences were obtained using a nonelastic tape measure, and they were recorded to the nearest quarter of an inch. The waist measurement was taken at the level of the umbilicus (i.e., navel) and the hip measurement was taken at the maximum circumference of the buttocks (Heyward & Stolarczyk, 1996; Powers & Dodd, 2003). Circumference measurements are related to fat and lean body mass, and they are preferable to skinfold measurements in obese individuals (Heyward & Stolarczyk). Less error is associated with circumference measurements, and the difference between technicians is smaller compared with skinfold measurements because less technician skill is required (Heyward & Stolarczyk).

A waist-to-hip circumference ratio (WHR) is determined by dividing the waist circumference by the hip circumference (Heyward & Stolarczyk, 1996; Powers & Dodd, 2003). A WHR that is greater than 0.80 indicates a moderate to high risk of heart disease for women due to excess abdominal fat (Powers & Dodd).

Personal History Questionnaire. The Personal History Questionnaire was developed for this study. For sample one, participants' age, height, weight, current occupation, ethnic background, marital status, highest level of education, annual family income, and prior experience with the weight-loss program was obtained (see Appendix A). Only women who were first time participants of the program were eligible for the elicitation study. Their beliefs would not be influenced by past program experiences compared to women who had repeated the program multiple times.

For sample two, information on participants' age, height, weight, ethnic background, education, marital status, annual family income, employment status, number of children, number of days they weigh themselves, past weight loss attempts, and pounds lost during their most recent weight loss attempt was obtained (see Appendix B). Program repetition was not possible for the participants in sample two.

Leisure-Time Exercise Questionnaire (LTEQ). The LTEQ assesses the self-reported frequency of mild, moderate, and strenuous exercise performed for 15 min or more during leisure-time over the course of an average week (Godin, Jobin, & Bouillon, 1986; Godin & Shephard, 1985; see Appendix C). The total score is weighted in metabolic equivalents (METs), and it is determined by summing the three subscales (Mild x 3) + (Moderate x 5) + (Strenuous x 9). The LTEQ is a reliable and valid measure of exercise (Jacobs, Ainsworth, Hartman, & Leon, 1993). The participants used the LTEQ to report current exercise performed during a typical week (e.g., before their involvement in the weight-loss program). If participants missed the orientation, they did not complete the LTEQ.

Elicitation Questionnaire. Following the procedures of Ajzen and Fishbein (1980), the participants recorded their beliefs about exercising and following the diet in response to 10 open-ended statements. Four double-spaced lines followed each statement for participants to record their responses (see Appendix D). Participants were encouraged to report multiple beliefs. The belief items were based on the wording of Courneya and Friedenreich (1999). To elicit behavioral beliefs, participants recorded the advantages and disadvantages of exercising and following the diet during the 4-week program. Two items were used to assess the behavioral beliefs for exercise: "List the main advantages of exercising during the weight-loss program" and "List the main disadvantages of exercising during the weight-loss program." Two similar items were used to examine the behavioral beliefs for following the diet: "List the main advantages of following the diet during the weight-loss program" and "List the main disadvantages of following the diet during the weight-loss program." For control beliefs, participants listed the main factors that prevented and helped them to exercise and to follow the diet during the weight-loss program. The four items used to assess control beliefs for exercising and following the diet were (a) "List the main factors that prevented you from exercising during the weight-loss program," (b) "List the main factors that helped you to exercise during the weight-loss program," (c) "List the main factors that prevented you from following the diet during the weight-loss program," and (d) "List the main factors that helped you to follow the diet during the weight-loss program." To measure normative beliefs, participants identified the individuals or groups who were important to them when they thought about exercising and following the diet during the weight-loss program. Two items were used to elicit the normative beliefs of overweight women for exercising and following the diet: "List the individuals or groups who were important to you when you thought about exercising during the weight-loss program" and "List the individuals or groups who were important to you when you thought about following the diet during the weight-loss program."

Procedure: Sample One

Exercise program description. Orientation for the weight-loss program was held at the fitness center during the week before the start of the program. Participants spent 10 to 15 min completing an informed consent document approved by the Institutional Review Board (Appendices E and F), the Personal History Questionnaire, and the LTEQ. Next, the format for the weight-loss intervention was explained. During the remainder of the week, trainers from the fitness center collected the preprogram measurements of weight, percent body fat, and circumferences from the participants. Four participants did not have skinfold measurements taken because their BMI was greater than 34.9 (class II or class III obesity).

The group exercise classes began on the Monday after the program orientation. Group exercise classes met three times a week on Monday, Wednesday, and Friday for 4 weeks. The classes lasted 60 min. Participants had a choice of the following three workout classes during the day: 6:00 a.m., 1:00 p.m., or 7:00 p.m. Trainers employed by the fitness center led each exercise class through a similar format. Each exercise class began with the trainer marking attendance. During two classes each week, the first 30 min was spent doing calisthenics or resistance training (e.g., crunches, pushups, wall squats, lunges, dips). The last half of the exercise class was devoted to cardiorespiratory activity. The participants chose from either indoor cardiorespiratory machines (e.g., treadmill, stairmaster, elliptical precor, stationary recumbent bicycle, crossrobic) or a group walk outdoors. The third class of each week began with a 10 to 15 min warm-up on the aforementioned cardiorespiratory machines, followed by a 30 to 45 min circuit workout. The circuit typically contained 10 to 15 alternating calisthenic and cardiorespiratory stations. Each station was performed for a maximum of 3 min. Participants were also encouraged to participate in two additional bouts of cardiorespiratory exercise during their leisure-time.

Diet program description. The diet was distributed and explained during the program orientation. During week one, calories were restricted to 1200 to 1300 and were broken down into 60% carbohydrate, 20% fat, and 20% protein. Calories increased to 1300 to 1400 during weeks two and three, but the proportions of carbohydrate, fat, and protein were different for each week. Week two was represented by 51%, 26%, and 23%, respectively; and week three was broken down into 53% carbohydrate, 24% fat, and 23% protein. During the final week, calories were increased to 1400 to 1500 and were represented by 50% carbohydrate, 16% fat, and 28% protein. The registered dietician employed by the fitness center developed the diet specifically for this weight-loss program.

Elicitation study. One hundred and fifty-three women enrolled in a 4-week weight-loss program at a private fitness center over the course of 7 months. Of those women, 110 (71.9%) were first time program participants and eligible to participate in the elicitation study. Forty-two women (27.5%) repeated the program more than once during data collection and one was under age 18, making them ineligible to participate in the research. Twenty of the first time participants (18.2%) dropped out of the program. Women were classified as dropouts if they missed the last six exercise classes (i.e., the last two weeks of the program; n = 14) or if they contacted the fitness center and withdrew from the program (n = 6). Therefore, 90 women were eligible to participate in the elicitation study at the end of the 4-week program.

Trainers distributed the study materials during the last exercise class and at the exit meeting the following week. The materials included an informed consent document approved by the Institutional Review Board, demographic questions, and an elicitation questionnaire containing 10 open-ended items assessing participants' behavioral, normative, and control beliefs regarding exercise and diet behavior. These questions were administered at the end of the program because the women were most likely to have formed beliefs regarding exercise and diet after the program compared to during the program.

Seventy-one questionnaires were distributed because participants did not attend the last exercise class, did not attend the exit meeting, or declined participation. All participants who received an elicitation questionnaire also received a preaddressed, stamped envelope for return mailing. Thirty-eight questionnaires were returned resulting in a response rate of 53.5%.

Only overweight participants were included in the final sample. Participants were considered to be overweight if their BMI was higher than 24.9 (indicating overweight or obesity) or if their WHR was greater than 0.80 (indicating a moderate to high risk of disease) at the start of the program. Nine participants were eliminated from the sample because they did not meet these standards. Four participants were also eliminated from the sample because they were university students, and two women were eliminated because they were significantly older than the remaining participants. Thus, twenty-three overweight and obese participants were included in the final sample.

Finally, the same trainer who performed the assessments at the start of the program obtained the postprogram measurements of body composition (i.e., weight, percent body fat, and circumferences) during the last week of the exercise classes and the week after the completion of the program.

Procedure: Sample Two

Exercise program description. Orientation for the weight-loss program was held on campus one to two weeks before the start of the group exercise classes. After the program format was introduced and explained, participants spent 10 to 15 min completing an informed consent document approved by the Institutional Review Board (Appendices G and H), the Personal History Questionnaire, and the LTEQ. During the next two weeks, preprogram measurements of weight, percent body fat, and waist and hip circumferences were collected. Three participants did not have skinfold measurements taken because their BMI was greater than 34.9 (class II or class III obesity).

The group exercise classes began on a Monday one to two weeks after the program orientation. Group exercise classes met three times a week on Monday, Wednesday, and Friday for 4 weeks. The classes were at the same time each day (2:45 to 4:00 p.m) and participants were expected to attend most, if not all, of the group exercise classes. The program trainer led each exercise class through a similar format. The first 15 min of each class began with the program trainer marking attendance. Questions or concerns regarding the exercise and diet were addressed. Two days a week, the next 20 min of class was spent doing calisthenics or resistance training (e.g., crunches, pushups, wall squats, lunges, dips). The next 30 to 40 min of the exercise class was devoted to cardiorespiratory activity. The participants either did a group walk outdoors in the football stadium or used the indoor cardiorespiratory machines (e.g., treadmill, stairmaster, elliptical precor, stationary recumbent bicycle). The third class of the week consisted of a 45 min circuit workout. The circuit typically contained 10 to 15 alternating calisthenic and cardiorespiratory stations. Each station was performed for 1 to 3 min. Participants were also encouraged to participate in at least two additional bouts of cardiorespiratory exercise during their leisure-time.

Diet program description. The food menus were distributed and explained during the program orientation. The menus were based on a 1500-calorie diet. Calories for the diet were based on demographics of the average participant (N = 38) from sample one (M age = 37.71, M height = 64.46 inches, M weight = 162.30 pounds) and were estimated using the Harris-Benedict equation [BMR = 655 + 9.6 (weight in kg) + 1.8 (height in cm) – 4.7(age)] and multiplied by a high (1.5; very active) and low (1.2; bedrest) activity factor to yield a range for caloric requirements (Israel, 1998). For gradual weight loss (i.e., approximately a pound per week), a negative caloric balance of 500 calories is sufficient (ACSM, 2000), thus resulting in a range of 1200 to 1700 calories. A 1500-calorie goal was chosen because it was approximately the average of the caloric range. The meals were divided into smaller portions enabling participants to eat more frequently throughout the day. Individuals who consume smaller, more frequent meals are more successful at losing weight and maintaining weight loss (McCarthy, 1998). Also, people typically experience hunger 4 to 6 hours after eating because the food has been removed from the stomach and absorbed by the intestine (Sizer & Whitney, 2000). Therefore, eating six small meals would necessitate eating approximately every 2 to 4 hours to prevent feelings of hunger. Sixty percent of the total calories were derived from carbohydrates, 20% of the total calories were made up of protein, and 20% of the total daily calories were consumed from fat. This is classified as a low-fat diet based on the recommended daily allowances (RDA), and it is recommended to facilitate weight loss (Sizer & Whitney).

Elicitation study. Fifty-three female students volunteered to participate in a 4-week exercise and diet program sponsored by the University of Florida's student recreation and fitness center (SRFC). All volunteers were first time participants of the program. Thirteen participants (24.5%) dropped out of the program before the end of the 4 weeks. Participants were dropouts if they withdrew from the program ($n = 8$), did not attend the last six exercise classes (n = 3), or did not attend the exit meeting or second fitness assessment (n = 2).

Forty participants completed a questionnaire containing 10 open-ended items concerning their behavioral, normative, and control beliefs regarding exercise and diet. These questions were completed during the exit meeting that took place the week after the last exercise class or at the postprogram fitness assessment during the week after the last exercise class (i.e., if participants were unable to attend the exit meeting).

Only overweight participants were included in the final sample. Participants were included if their BMI was higher than 24.9 (indicating overweight or obesity) or if their WHR was greater than 0.80 (indicating a moderate to high risk of disease) at the start of the program. Six participants were eliminated from the sample because they did not meet either of these qualifications. Additionally, one student was eliminated from the sample because she was significantly older than the remaining participants. Therefore, thirty-three overweight and obese participants were included in the final sample.

Postprogram fitness assessments were conducted during the week after the last group exercise class. Measurements of weight, percent body fat, and waist and hip circumferences were recorded.

Data Analysis

To assess the salient exercise and diet beliefs, and to follow the recommendations of Ajzen and Fishbein (1980), a five-step procedure was employed. First, the raw data themes (i.e., open-ended responses) were tabulated and categorized by belief type (i.e., behavioral, normative, or control) and behavior (i.e., exercise or diet). Second, the raw data themes were organized into higher-order themes based on the procedures of Patton

(1990). Third, a content analysis (i.e., frequency counts) was conducted to determine the most salient beliefs. Consistent with previous researchers, the most frequent 5 to 10 beliefs were identified as the most salient beliefs (Ajzen, 1991; Carron et al., 2003). The content analysis was conducted by (a) sorting participant's responses into sets of statements which involved the same underlying belief, (b) obtaining a frequency count for each set of beliefs to determine the most salient beliefs, and (c) double-checking the belief sets to insure that all of the beliefs were appropriately sorted (Patton). Fourth, three experts (i.e., two experts on the TPB and one doctoral student specializing in exercise psychology) reviewed the beliefs to determine consistency in the classifications. Finally, the beliefs were rank-ordered from the most to the least salient. Detailed lists of the exercise and diet beliefs for samples one and two are located in Table 2-5 and Table 2-6, respectively.

Repeated measures analyses of variance (ANOVA) were performed to determine the effectiveness of the weight-loss intervention for reducing participants' BMI, percent body fat, and circumferences from pre to postprogram.

Results

Sample One

Behavioral beliefs. The most salient behavioral advantages of exercising during the weight-loss intervention were (a) improves physical appearance (56.5%), (b) improves psychological well-being (52.2%), (c) creates a healthier lifestyle (30.4%), (d) improves fitness level (21.7%), (e) increases motivation (21.7%), (f) increases energy (17.4%), (g) provides leader instruction (17.4%), (h) provides social support (13.0%), and (i) provides enjoyment (4.3%). The most frequently reported behavioral disadvantages

Table 2-5

Type, Number (N), and Percent (%) of Exercise and Diet Beliefs Reported by Sample One

Higher Order Theme	Raw Data Theme(s)	N[a]	%
Exercise Behavioral Beliefs (Advantages)			
Improves physical appearance	Helps with toning and losing inches, toning, weight loss, to lose body fat, faster weight loss	13	56.5
Improves psychological well-being	Feel better, increased self-esteem, improved feeling of well-being, you feel better about yourself	12	52.2
Creates a healthier lifestyle	Sleep better, increases metabolism rate, expend calories	7	30.4
Improves fitness level	Strengthening, increases endurance, increases conditioning, increases flexibility	5	21.7
Increases motivation	Helps with motivation, needed to give yourself a little push, knowing someone was watching me made me work harder toward my goals	5	21.7
Increases energy	Invigorating, usually gives you energy, it is energizing, increased energy	4	17.4
Provides leader instruction	Guidance of the counselors, personal trainer	4	17.4
Provides social support	Social support, working out with other women in my same position made it easier	3	13.0
Provides enjoyment	It is fun	1	4.3
Diet Behavioral Beliefs (Advantages)			
Improves eating habits	Less cravings for sweets and junk food, instilled good, life-long eating habits, learning portion size, making yourself break old habits	11	47.8
Convenience	Lack of preparation of food makes it easy, no thinking, no cooking, easy to follow, food is easy to prepare, easy to decide what to eat	8	34.8
Improves physical appearance	Weight loss, increase weight loss, lost inches, lost fat, helps to ensure success on my weight loss	7	30.4

Table 2-5. Continued

Higher Order Theme	Raw Data Theme(s)	N	%
Improves psychological well-being	Felt better, let me know that I could be satisfied without a lot of starchy food	2	8.7
Exercise Behavioral Beliefs (Disadvantages)			
Fatigue or tiredness	Sometimes when too fatigued, exhaustion, maybe too tired, lack of energy	5	21.7
Prearranged time of the workout	Limiting yourself to the time slot provided, always making sure I was there at that specific time	3	13.0
Lack of time	It takes time away from my children, it takes time away from things I should be doing at home	2	8.7
Physical ailments	Makes you more hungry, I feel you would be more hungry	2	8.7
Lack of variety	Would have been nice to have alternated weight training with calisthenics	1	4.3
Diet Behavioral Beliefs (Disadvantages)			
Inconvenience	Planning required, preparing different food for family, no help in making homemade meals	7	30.4
Lack of variety	It is boring, boring food, boring cuisine, got tired with the food choices	7	30.4
Social situations	Hard to follow when eat out, difficult to meet with friends for dinner out, could not go out to work with coworkers	4	17.4
Physical ailments	Sometimes you get hungry, stayed hungry a lot, too much dairy causes sinus infections	3	13.0
Lack of freedom	Less freedom, cannot eat favorite foods, not being able to cheat	3	13.0
Dissatisfaction with the food	It did not meet my nutritional needs, some items I did not like	2	8.7
Temptations	Putting up the food after my family ate was a temptation	1	4.3
Exercise Control Beliefs (Obstructing Factors)			
Family responsibilities	My children, kids and family, family involvement	3	13.0
Lack of time	Time, time management	3	13.0

Table 2-5. Continued

Higher Order Theme	Raw Data Theme(s)	N	%
Travel	Out of town, trip	3	13.0
Job or school responsibilities	My work schedule, job related activities	2	8.7
Lack of motivation	Laziness, not a self-starter	2	8.7
Fatigue or tiredness	Too tired because overweight	1	4.3
Mood disturbances	Stress	1	4.3
Physical ailments	Migraines	1	4.3
Prearranged time of the workout	The time (7:00 PM)	1	4.3
Diet Control Beliefs (Obstructing Factors)			
Social situations	When dining out, visitors from foreign country, birthday party	6	26.1
Temptations	Craved chocolate, cravings, when really hungry, my family who doesn't need to diet ate sweets and desserts which are my downfall	5	21.7
Dissatisfaction with the food	Could not eat that much dairy, hate diary and didn't eat it on a regular basis	5	21.7
Job or school responsibilities	Work, work related trips, business and work related lunches	5	21.7
Travel	Work related trips, having to go out of town, travel for work out of town	3	13.0
Mood disturbances	Will power, stress, frustration with limited dinner choice	3	13.0
Lack of time	Poor planning, so busy forgot to check the menu and forgot to record daily eating habits	2	8.7
Family responsibilities	Family needs	1	4.3
Physical ailments	Low caloric intake increased the intensity or severity of my hot flashes	1	4.3
Exercise Control Beliefs (Facilitating Factors)			
Social support	Having a group to meet everyday, group support, support from other members, all the support from others	11	47.8
The program structure	Time slot was a good time for me, regular schedule, having a certain time to show up, structure and step-by-step instruction	9	39.1

Table 2-5. Continued

Higher Order Theme	Raw Data Theme(s)	N	%
Program trainers	Being motivated by the trainer, personal trainer supervision, great trainers	7	30.4
Motivation	Motivation to lose weight, staying focused on why I wanted to lose weight, commitment to the programs, seeing myself get stronger	7	30.4
Improving physical appearance	Want to lose some weight, noticeable results, seeing some weight loss showed what I was doing was working	5	21.7
Enjoyment	Enjoy the feeling that comes with exercising, I enjoy working out	2	8.7
Increases energy	Want to have more energy, having more energy	2	8.7
Diet Control Beliefs (Facilitating Factors)			
Convenience	Portable food, didn't have to cook, easy to fix ahead, easy to follow, convenience of food chosen, microwave meals made it easy when I got home from work late	11	47.8
Improving physical appearance	Desire to lose weight, loss of inches, seeing weight loss results, desire to lose weight and inches	7	30.4
Motivation	My goals, self-motivation, wanted to fit into my clothes better rather than buying new ones again	5	21.7
Social support	Support received from everyone in the program, friends, and family, encouragement of women at the club	3	13.0
Satisfaction with the food	I liked the foods chosen, taste of food chosen, diet was good and filling	3	13.0
Exercise Normative Beliefs			
Program trainers	Trainer, the instructor, personal trainers	12	52.2
Group members	Class, partners in program, rest of the group, others in the program	9	39.1
Family	Family, daughter, immediate family	6	26.1
Friends	Friends, best buddy	4	17.4
Spouse or significant other	Husband	3	13.0

Table 2-5. Continued

Higher Order Theme	Raw Data Theme(s)	N	%
Diet Normative Beliefs			
Program trainers	Trainer, coach, the instructors	9	39.1
Family	Family, daughter, children	8	34.8
Group members	Class, the group, other program participants, others in the group	6	26.1
Spouse or significant other	Husband	4	17.4
Friends	Friends	1	4.3

Note. N = number of participants. [a]May not add up to 100% because some participants reported multiple beliefs.

Table 2-6

Type, Number (N), and Percent (%) of Exercise and Diet Beliefs Reported by Sample Two

Higher Order Theme	Raw Data Theme(s)	N[a]	%
Exercise Behavioral Beliefs (Advantages)			
Social support	Support, encouragement, group support, it was a good support program, moral support, we all were very supportive of each other	16	48.5
Increases motivation	Motivation to continue because others are aware of your performance, there were people there trying to accomplish the same thing as me and they motivated me	16	48.5
Program structure	I liked having the time and place constant, scheduled time, kept me on a schedule, planned and organized exercise	8	24.2
Creates a healthier lifestyle	It helped me learn what to eat, it helped me learn what types of exercises are beneficial, learning various workouts that I can do at home	6	18.2
Enjoyment	It's usually fun, more entertaining, it kept me looking forward to coming, the group motivation made the experience enjoyable	5	15.2
Provides leader instruction	You have the instruction of a teacher to keep you motivated, we all got encouragement from the trainer	2	6.1
Improves physical appearance	Losing weight/gaining muscle	1	3.0
Improves psychological well-being	My stress level is less now	1	3.0
Improves fitness level	Getting in shape	1	3.0
Diet Behavioral Beliefs (Advantages)			
Improves eating habits	I knew I was eating healthy, it taught me exactly what I needed to eat daily, it was healthy eating, reduce fat intake	18	54.5
Convenience	You know what dinner will be ahead of time, easier to shop for, you don't have to make a grocery list, it was a set plan	11	33.3

Table 2-6. Continued

Higher Order Theme	Raw Data Theme(s)	N	%
Satisfaction with the food	I liked the food, it didn't feel like a diet, wasn't ever really hungry	9	27.3
Improves psychological well-being	I felt healthier, when I was on it I felt a lot healthier, I definitely felt much better about what I was eating, feeling good	8	24.2
Improves physical appearance	I hoped that if I stuck to it that I would lose weight, I could see myself looking better	5	15.2
Increases energy	I had slightly more energy, felt energized	2	6.1
Cost	Cost-effective-I didn't spend money on expensive food on campus, cheaper than eating out	2	6.1
Exercise Behavioral Beliefs (Disadvantages)			
Prearranged time of the workout	Sometimes it didn't always fit my schedule, if you miss class you just miss it, sometimes there were time conflicts	6	18.2
Lack of personal control	You have to do what the group does even when you don't enjoy it, you can't go at your own pace, no individual control	6	18.2
Mood disturbances	Feeling insecure because I don't like exercising around people, feeling of guilt when you miss a class	5	15.2
Too much diversity in skill level	Some were much more fit and could do much, much more, different levels of ability all in one room	3	9.1
Lack of support	When people didn't show up it was kind of discouraging	2	6.1
Lack of variety	Got boring after awhile, I thought the intensity could have been increased a little during the program	2	6.1
Job or school responsibilities	Less time to study, I had a class directly afterwards and I couldn't do the cardio with the group	2	6.1
Lack of time	Took up time	1	3.0
Lack of individual attention	You do not get as much one on one attention	1	3.0
Fatigue or tiredness	Makes days longer	1	3.0

Table 2-6. Continued

Higher Order Theme	Raw Data Theme(s)	N	%
Diet Behavioral Beliefs (Disadvantages)			
Inconvenience	Not eating until I could get home unless I packed food, took time to prepare, run out of food sooner, forced me to go shopping every week	11	33.3
Lack of variety	It was redundant, it was boring, the food got boring, monotonous	9	27.3
Dissatisfaction with the food	Too much protein for my taste, some of the meals I didn't like, too much food some days	8	24.2
Temptations	Watching my roommate eat ice cream, sweets, it was so hard resisting eating some of my normal meals	6	18.2
Lack of freedom	Not being able to eat junk when I feel like it, having to stay home and cook when my friends went out to eat	6	18.2
Cost	It was very expensive to stick to the diet, expensive, it can be a little expensive	5	15.2
Social situations	Eating out with friends, it was hard to say not to eating out	4	12.1
Mood disturbances	Feeling guilty about eating out, it made me obsess over my food and I became a little depressed when I wouldn't do well	2	6.1
Lack of time	Time to prepare and organize food and food logs	1	3.0
Exercise Control Beliefs (Obstructing Factors)			
Job or school responsibilities	A test scheduled at the same time, work/school conflicts, work, class, scheduling of tests	16	48.5
Travel	Going out of town, I had to go out of town, I was out of town	9	27.3
Fatigue or tiredness	I was tired one day, I didn't come one day because I was tired, very tired	5	15.2
Physical ailments	I got sick, being sick, sickness, one terrible headache	5	15.2
Social situations	I had people from out of town come over, summer wedding and preparation, having fun with friends	5	15.2
Unforeseen events	Flat tire, oversleeping	2	6.1

Table 2-6. Continued

Higher Order Theme	Raw Data Theme(s)	N	%
Lack of transportation	My car was in the shop so I had no transportation	1	3.0
Diet Control Beliefs (Obstructing Factors)			
Temptations	Seeing what other people were eating, the existence of chocolate, cravings for sweets, cravings for chocolate and salt	12	36.4
Inconvenience	Ran out of food sometimes, going grocery shopping 2-3 x week, running out of groceries	9	27.3
Social situations	Being social, wedding, when my mom visited, having to go out to clubs, dinner, or entertain guests	9	27.3
Mood disturbances	Got munchies when I am bored, stress, feeling down	4	12.1
Travel	Having different events and trips throughout the month that would cause me to go out of town, being out of town	4	12.1
Cost	No money to buy some of the foods, towards the end I couldn't afford it anymore, running out of money	4	12.1
Lack of time	The chaos of my weekend schedule, my busy schedule made it kind of hard to eat everything	4	12.1
Lack of variety	Got bored with the same 5 menus, I got bored with the same stuff	3	9.1
Dissatisfaction with the food	The unappetizing thought of pretzels again, I don't like diary products	2	6.1
Job or school responsibilities	Being at work where I don't have groceries, work	2	6.1
Lack of freedom	Felt restricted	1	3.0
Exercise Control Beliefs (Facilitating Factors)			
Social support	I like working in the group because we all motivate each other to push through it, moral support, support from fellow participants	14	42.4
Program structure	It was a specific time/day of the week, knowing that the instructor would be there to mark me absent or present on the attendance roster, it was at a set time	11	33.3

Table 2-6. Continued

Higher Order Theme	Raw Data Theme(s)	N	%
Motivation	Motivation-didn't want to "not show up", wanting to get my daily dose of exercise, knowing I would not exercise if I didn't go to class	10	30.3
Enjoyment	It was fun getting together with the group, fun, enjoyed interacting with people in the program	5	15.2
Convenience	I set that time aside specifically to exercise, I would know that if I exercised with the group I wouldn't have to do it later in the day	3	9.1
Program trainer	We were constantly being encouraged to keep working our hardest, encouragement from instructor	3	9.1
Improving physical appearance	Wanting to lose weight, looking good	2	6.1
Creates a healthier lifestyle	Knowing the physical activity was good for me, I know that it is good for my health given my family history	2	6.1
Diet Control Beliefs (Facilitating Factors)			
Improving physical appearance	Wanting to lose weight, my desire to be thin, my idea to look great on Christmas when I am going to visit my family	10	30.3
Satisfaction with the food	Food was good, the foods I enjoyed served as a treat, I like the majority of the foods on the menus	9	27.3
Program structure	Eating often kept me from getting hungry or feeling deprived, having to write all the crap I did eat when I didn't follow the diet, what I learned	9	27.3
Social support	My boyfriend motivated me to stick to it the most, my roommate who was doing it with me, family encouragement	6	18.2
Convenience	The menus made it easier, I didn't have to count calories, meals were quick to prepare	6	18.2
Motivation	My own desire to stick to the plan, I knew it was only going to be 4 weeks and I really wanted to test myself	6	18.2
Improving psychological well-being	I felt good after eating it, how I felt after exercising, feel much healthier	4	12.1

Table 2-6. Continued

Higher Order Theme	Raw Data Theme(s)	N	%
Creates a healthier lifestyle	The benefits of it, I really wanted to change my eating habits, knowing it was good for me	3	9.1
Exercise Normative Beliefs			
Group members	The people I walked with, the other people in the group, our exercise group	17	51.5
Program trainer	Our instructor, the teacher	12	36.4
Family	My mom, my family, parents	11	33.3
Friends	A couple of my close friends, my roommate, sorority sisters, my friends	9	27.3
Spouse or significant other	My boyfriend, my husband	7	21.2
Diet Normative Beliefs			
Friends	Sorority sisters, friends, my roommate, my friends that drove me to the store	15	45.5
Family	Family, parents, my mom, my sister	14	42.4
Spouse or significant other	My boyfriend, my husband	12	36.4
Group members	The group, girls in the group, fellow mates in the program	6	18.2
Program trainer	The instructor	1	3.0

Note. N = number of participants. [a]May not add up to 100% because some participants reported multiple beliefs.

include (a) fatigue or tiredness (21.7%), (b) the prearranged time of the workout (13.0%), (c) lack of time (8.7%), (d) physical ailments (8.7%), and (e) lack of variety (4.3%)[1]. For following the diet during the weight-loss program, the most salient behavioral advantages were (a) improves eating habits (47.8%), (b) convenience (34.8%), (c) improves physical appearance (30.4%), and (d) improves psychological well-being (8.7%). The most common behavioral disadvantages that were identified were (a) inconvenience (30.4%), (b) lack of variety (30.4%), (c) social situations (17.4%), (d) physical ailments (13.0%), (e) lack of freedom (13.0%), (f) dissatisfaction with the food (8.7%), and (g) temptations (4.3%).

Control beliefs. The most salient control beliefs that obstructed exercise behavior during the weight-loss program were (a) family responsibilities (13.0%), (b) lack of time (13.0%), (c) travel (13.0%), (d) job or school responsibilities (8.7%), (e) lack of motivation (8.7%), (f) fatigue or tiredness (4.3%), (g) mood disturbances (4.3%), (h) physical ailments (4.3%), and (i) the prearranged time of the workout (4.3%). The most common control beliefs that facilitated exercise included (a) social support (47.8%), (b) the program structure (39.1%), (c) the program trainers (30.4%), (d) motivation (30.4%), (e) improving physical appearance (21.7%), (f) enjoyment (8.7%), and (g) increases energy (8.7%). For following the diet, the most frequently cited control beliefs that obstructed diet behavior during the weight-loss program were (a) social situations

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[1] Percents add up to more than 100% because some of the participants recorded multiple exercise and diet beliefs.

(26.1%), (b) temptations (21.7%), (c) dissatisfaction with the food (21.7%), (d) job or school responsibilities (21.7%), (e) travel (13.0%), (f) mood disturbances (13.0%), (g) lack of time (8.7%), (h) family responsibilities (4.3%), and (i) physical ailments (4.3%). The facilitating control beliefs were (a) convenience (47.8%), (b) improving physical appearance (30.4%), (c) motivation (21.7%), (d) social support (13.0%), and (e) satisfaction with the food (13.0%).

Normative beliefs. The five most salient normative beliefs for exercise during the weight-loss intervention were (a) the program trainers (52.2%), (b) group members (39.1%), (c) family (26.1%), (d) friends (17.4%), and (e) spouse or significant other (13.0%). Five salient normative beliefs for following the diet included (a) the program trainers (39.1%), (b) family (34.8%), (c) group members (26.1%), (d) spouse or significant other (17.4%), and (e) friends (4.3%).

Body composition measures. Results of the repeated measures ANOVAs revealed that participants had significantly reduced their BMI, Wilks' Lambda = .28, F (1, 19) = 49.77, $p < .001$, $\eta^2 = .72$; percent body fat, Wilks' Lambda = .30, F (1, 15) = 34.49, $p < .001$, $\eta^2 = .70$; waist circumference, Wilks' Lambda = .65, F (1, 19) = 10.18, $p = .005$, $\eta^2 = .35$; and hip circumference, Wilks' Lambda = .38, F (1, 19) = 31.62, $p < .001$, $\eta^2 = .63$, by the end of the 4-week weight-loss intervention (see Table 2-7 for M and SD scores). On average, participants lost 4.5% of their initial body weight during the 4-week program.

Sample Two

Behavioral beliefs. The behavioral advantages for exercise were (a) social support (48.5%), (b) increases motivation (48.5%), (c) the program structure (24.2%), (d) creates a healthier lifestyle (18.2%), (e) enjoyment (15.2%), (f) provides leader instruction (6.1%), (g) improves physical appearance (3.0%), (h) improves psychological well-being (3.0%), and (i) improves fitness level (3.0%). The most common behavioral disadvantages were (a) the prearranged time of the workout (18.2%), (b) lack of personal control (18.2%), (c) mood disturbances (15.2%), (d) too much diversity in skill level (9.1%), (e) lack of support (6.1%), (f) lack of variety (6.1%), (g) job or school responsibilities (6.1%), (h) lack of time (3.0%), (i) lack of individual attention (3.0%), and (j) fatigue or tiredness (3.0%). The behavioral advantages for following the diet were (a) improves eating habits (54.5%), (b) convenience (33.3%), (c) satisfaction with the food (27.3%), (d) improves psychological well-being (24.2%), (e) improves physical appearance (15.2%), (f) increases energy (6.1%), and (g) cost (6.1%). The most frequently reported disadvantages were (a) inconvenience (33.3%), (b) lack of variety (27.3%), (c) dissatisfaction with the food (24.2%), (d) temptations (18.2%), (e) lack of freedom (18.2%), (f) cost (15.2%), (g) social situations (12.1%), (h) mood disturbances (6.1%), and (i) lack of time (3.0%).

Table 2-7
Mean (M) and Standard Deviation (SD) Scores for the Body Composition Measurements from Pre to Postprogram for Sample One

	Pre		Post	
Measurement	M	SD	M	SD
Body Mass Index	29.13	5.10	27.80	4.68
Percent Body Fat	31.34	4.49	29.29	4.25
Waist	36.81	4.75	35.72	4.41
Hip	42.25	3.74	41.18	3.41

Note. Circumference measurements were recorded in inches. All measurements significantly reduced from pre to postprogram at $p < .01$.

Control beliefs. The control beliefs that obstructed exercise were (a) job or school responsibilities (48.5%), (b) travel (27.3%), (c) fatigue or tiredness (15.2%), (d) physical ailments (15.2%), (e) social situations (15.2%), (f) unforeseen events (6.1%), and (g) lack of transportation (3.0%). Facilitating factors of exercise included (a) social support (42.4%), (b) the program structure (33.3%), (c) motivation (30.3%), (d) enjoyment (15.2%), (e) convenience (9.1%), (f) the program trainer (9.1%), (g) improving physical appearance (6.1%), and (h) creates a healthier lifestyle (6.1%). The most salient control beliefs that obstructed diet behavior during the weight-loss intervention were (a) temptations (36.4%), (b) inconvenience (27.3%), (c) social situation (27.3%), (d) mood disturbances (12.1%), (e) travel (12.1%), (f) cost (12.1%), (g) lack of time (12.1%), (h) lack of variety (9.1%), (i) dissatisfaction with the food (6.1%), (j) job or school responsibilities (6.1%), and (k) lack of freedom (3.0%). The most common factors that facilitated diet behavior were (a) improving physical appearance (30.3%), (b) satisfaction with the food (27.3%), (c) the program structure (27.3%), (d) social support (18.2%), (e) convenience (18.2%), (f) motivation (18.2%), (g) improving psychological well-being (12.1%), and (h) creates a healthier lifestyle (9.1%).

Normative beliefs. The five most salient normative beliefs for exercising during the weight-loss intervention were (a) the group members (51.5%), (b) the program trainer (36.4%), (c) family (33.3%), (d) friends (27.3%), and (e) spouse or significant other (21.2%). For following the diet, the normative beliefs were (a) friends (45.5%), (b) family (42.4%), (c) spouse or significant other (36.4%), (d) group members (18.2%), and (e) the program trainer (3.0%).

Body composition measures. Results of the repeated measures ANOVAs indicated that participants had significantly reduced their BMI, Wilks' Lambda = .53, $F\ (1, 32) = 28.67$, $p < .001$, $\eta^2 = .47$; percent body fat, Wilks' Lambda = .40, $F\ (1, 28) = 42.39$, $p < .001$, $\eta^2 = .60$; and hip circumference, Wilks' Lambda = .73, $F\ (1, 32) = 11.98$, $p = .002$, $\eta^2 = .27$, from pre to postprogram (see Table 2-8 for M and SD scores). The waist circumference measurement was not significantly reduced, Wilks' Lambda = .97, $F\ (1, 32) = 0.98$, $p = .33$, $\eta^2 = .03$. Finally, on average, participants lost 1.4% of their initial body weight during the 4-week program.

Table 2-8
Mean (M) and Standard Deviation (SD) Scores for the Body Composition Measurements from Pre to Postprogram for Sample Two

	Pre		Post	
Measurement	M	SD	M	SD
Body Mass Index*	29.30	6.00	28.87	5.88
Percent Body Fat*	32.44	4.48	28.70	4.88
Waist	34.90	4.58	34.74	4.96
Hip*	42.14	4.66	41.59	4.32

Note. *Measurements significantly reduced from pre to postprogram at $p < .01$. Circumference measurements were recorded in inches.

Discussion

The main purpose of this study was to examine the frequency of the behavioral, normative, and control beliefs for exercise and diet using the theoretical framework of the TPB with two samples of overweight women who were participating in a weight-loss intervention. The second purpose was to assess the utility of the weight-loss intervention for reducing participants' weight and body composition. Several findings are highlighted in this section.

First, the frequency of exercise behavioral beliefs differed between the two samples of overweight women. For example, the most common behavioral advantage of exercise for the older sample of women was that exercise helps to improve physical appearance (e.g., helps with toning and losing inches); whereas in the student sample, the most common behavioral advantages of exercising with the group were the social support (e.g., we all were very supportive of each other) and that it increases motivation (e.g., there were people there trying to accomplish the same thing as me and they motivated me). Researchers attempting to increase exercise adherence during interventions with older and younger overweight women should consider the differences in behavioral advantages of exercise. Specifically with older women, researchers should emphasize how exercise can promote an increase in muscle mass and how muscle assists in weight loss and improving appearance. Exercise and diet interventions conducted with student populations should provide a supportive environment where participants are able to get to know one another and motivate each other.

These behavioral advantages also differ from behavioral beliefs held by other special and healthy populations (Carron et al., 2003; Symons Downs, 2002). For instance, Symons Downs conducted a review of 38 TPB elicitation exercise studies with healthy and special populations, and she reported that the most common behavioral advantage of exercise was that it improves physical and psychological health. Similarly, Carron and colleagues reported that the most common behavioral belief for healthy populations is that exercise improves fitness and health.

The most common behavioral disadvantage of exercise for the older sample of women was that exercise causes fatigue or tiredness (e.g., exhaustion). In comparison to the student sample, the most common behavioral disadvantages were the prearranged time of the workout (e.g., sometimes there were time conflicts) and a lack of personal control (e.g., you can't go at your own pace). Awareness of these behavioral disadvantages associated with exercise will aid in increasing exercise adherence during interventions. Researchers should attempt to implement exercises that are appropriate for older overweight women in regards to intensity, and progress gradually when increasing the exercise intensity in an effort to reduce fatigue. When working with overweight student populations, researchers may want to consider offering several group exercise classes and possibly offer more individual exercise prescriptions.

The behavioral disadvantages associated with exercise for these groups of overweight women are different from those identified by other populations (Symons Downs, 2002). For example, Symons Downs reported that the most common behavioral disadvantages of exercise for healthy and special populations are physical and psychological health issues (i.e., soreness, injury, tiredness). Although there are similarities in behavioral disadvantages with the older sample of overweight women, the student sample identified different disadvantages of exercise.

Unlike the exercise behavioral beliefs, both groups of overweight women reported the same behavioral beliefs for following the diet. For instance, both groups of women identified improving eating habits (e.g., less cravings for sweets and junk food, reduce fat intake) as the most common behavioral advantage of following the diet. Similarly, inconvenience (e.g., preparing different food for family, took time to prepare) and lack of variety (e.g., boring food, it was redundant) were the most frequently reported disadvantages of following the diet for both samples. For researchers to improve diet adherence during interventions, an emphasis should be placed on explaining how the diet provides a balance of carbohydrates, proteins, and fats, and reduces cravings for unhealthy foods (i.e., sweets and junk food) that will help participants adopt healthier eating behavior. In addition, effective interventions should also include diet menus that are simple to follow, easy to prepare, and that can be incorporated into their daily routine without much disruption.

Examination of the frequency of the control beliefs also provides important information for designing effective interventions for both groups of overweight women. For example, among the older women few obstructing factors of exercise were reported, but family responsibilities (e.g., family involvement) were identified as common obstructing factors and were not identified by the students. The most common obstructing factor of exercise for the students was school or job responsibilities (e.g., lab work/school conflicts). Therefore, to increase exercise adherence during similar programs, researchers should focus on methods to help older women delegate family and household responsibilities (e.g., time management skills, scheduling exercise sessions, providing child care during exercise groups) and teach students how to successfully balance school and work responsibilities with a regular exercise routine (e.g., using exercise as a study break, studying a little bit everyday instead of cramming).

The most frequently reported control beliefs of exercise for these two samples of overweight women differed from the control beliefs reported by other populations (Carron et al., 2003; Symons Downs, 2002). For example, in the review of elicitation studies, Symons Downs reported that physical and psychological issues are the most common obstructing factors of exercise for special and healthy populations. However, for healthy populations, lack of time was the most common control belief for exercise (Carron et al.).

The two groups of women identified social support (e.g., support from other members, support from fellow participants) to be the most important facilitating factor of exercise during the program. Similarly, Symons Downs (2002) reported that social support was the most common facilitating factor for exercise with healthy and special populations. Therefore, to promote exercise adherence within interventions, exercise classes should include individuals who have similar goals (i.e., weight-loss), because this may make the participants feel comfortable exercising and foster group support.

Differences were found between the two groups of overweight women regarding their control beliefs for following the diet. For the older women, social situations (e.g., birthday party) were more obstructive; however, temptations (e.g., craving for sweets) were more common for the students. Researchers should provide older women with tips on how to navigate social situations that involve food, so that they feel confident they can continue to eat healthy. Similarly, students should design behavioral strategies for dealing with temptations or cravings for unhealthy foods, such as calling a friend or going for a walk when they experience these feelings.

The most frequently reported facilitating factor for following the diet for the older women was the convenience of the diet (e.g., easy to follow); whereas, improving physical appearance (e.g., my idea to look great on Christmas when I am going to visit my family) was the most common facilitating factor for following the diet for the students. Thus, effective weight-loss interventions for older women should incorporate menu plans that are simple by reducing preparation time and limiting hard to find foods, but for students the focus should be on how healthy eating behaviors can promote weight loss and therefore, improve physical appearance.

Third, different groups of people were found to influence the exercise and diet behavior of these two groups of overweight women. For example, the most common normative influence for the older women to exercise with the group was from the program trainers. In comparison, the other group members had a larger influence with the students. These results are different from those found in elicitation studies conducted with other populations (Carron et al., 2003; Symons Downs, 2002). For instance, Symons Downs and Carron and collegues both reported that family and friends were the most important referent groups for exercise among special and healthy populations. Thus, the encouragement and support of the program trainers is important for promoting exercise adherence in older women; whereas, constructing a group environment that is supportive (e.g., small group size, similar goals, activities that encourage sharing) for students will increase their exercise participation.

Similarly, the most important normative influences for the older women for following the diet were the program trainers, but were the least important for the students. In contrast, friends were the most frequently reported normative influence for the students and the least important for the older women. The encouragement and support of the program trainers is instrumental for improving diet adherence among older women during interventions. However, during interventions designed for students, the involvement and encouragement from close friends is imperative for promoting diet adherence.

Finally, consistent with the hypothesis, the weight-loss intervention was successful at reducing participants' BMI, percent body fat, and waist and hip circumferences. As a result, participants of exercise and diet programs may become more motivated to continue their exercise participation and caloric reduction as physical results become evident.

Overall, the results of this research support the importance of conducting elicitation studies when examining special populations. However, three limitations of the research should be considered. First, the samples were self-selected into the weight-loss intervention. Therefore, these women were possibly more motivated to exercise and follow a diet than individuals who would have been randomly selected to participate in a similar program. Second, beliefs were not collected from individuals who dropped-out of the 4-week program. These individuals are the people who researchers are most interested in, and who can provide critical information essential for effective intervention design to increase exercise and diet adherence among inactive and overweight populations. Finally, the duration of the weight-loss program should be extended beyond 4 weeks to increase initial weight loss (Jeffery et al., 2000). Although significant changes were reported in weight and body composition for both samples, a minimum loss of 10% of initial body weight is needed to produce changes in disease risk factors (Jeffery et al.).

Although common themes do exist among overweight women, other special populations, and healthy populations, important differences were reported. In conclusion, these two elicitation studies allowed the development of a belief-based questionnaire for an older sample and student sample of overweight women, and maximized the predictive ability of the TPB.

Prelude to Chapter 3

Physical activity participation and maintaining a healthy weight have many physical and psychological benefits; yet many women are not regularly active and are overweight (USDHHS, 2000). Moreover, limited research examining exercise and diet beliefs and the determinants of exercise and diet behavior has been undertaken with overweight women. The findings from this study indicate that exercise and diet beliefs of overweight women differ from healthy populations and between different age groups of overweight women. Therefore, researchers trying to understand exercise and diet behavior of overweight women should consider these differences and design interventions according to these beliefs. Furthermore, the salient behavioral, normative, and control beliefs elicited from these two samples of overweight women provided the framework for a belief-based questionnaire used in Study 2. Chapter 3 (Study 2) was a 4-week prospective study of exercise and diet behavior using the TPB with two samples of overweight women who were participating in a weight-loss intervention.

CHAPTER 3

STUDY 2: EXERCISE AND DIET DETERMINANTS DURING A WEIGHT-LOSS PROGRAM: A PROSPECTIVE EXAMINATION

Physical inactivity, overweight, and obesity are growing health concerns in the United States (United States Department of Health and Human Services [USDHHS], 2000). About 60% of the adult population is not regularly physically active (USDHHS) and 64% are overweight and obese (Flegal, Carroll, Ogden, & Johnson, 2002). As a result, obesity-related health problems account for 300,000 annual deaths; second only to tobacco-related deaths (USDHHS). Thus, there is a need to conduct theoretically driven research of the determinants of physical activity and dietary behavior with overweight and obese populations to design effective weight-loss interventions.

A popular theoretical framework that is used to study exercise and diet behavior is Ajzen's (1985, 1988, 1991) theory of planned behavior (TPB). The TPB has been used successfully to study exercise and diet behaviors (see Armitage & Conner, 2001; Hausenblas, Carron, and Mack, 1997; Symons Downs & Hausenblas, 2002a for statistical reviews) among various populations (see Chapter 1 for literature review). However, given the prevalence of overweight and obesity among the general population, limited research examining the TPB with exercise and diet have studied these behaviors simultaneously in relationship to weight-loss (Ellis Gardner & Hausenblas, 2001), and few investigations of weight-loss and weight control have been conducted (Conner & Norman, 1996; Netemeyer, Burton, & Johnston, 1991; Schifter & Ajzen, 1985).

Moreover, several of the weight-loss and weight control studies are limited by methodological issues (Bagozzi & Kimmel, 1995; Ellis Gardner & Hausenblas, in press; Nguyen, Beland, Otis, & Potvin, 1996; Rodgers & Brawley, 1993).

For instance, all of the weight-loss and weight control studies failed to adhere to the guidelines established by Ajzen and Fishbein (1980) because they did not conduct an elicitation study to examine the participants' exercise and diet beliefs. Thus, because exercise and diet are critical for weight-loss and weight-loss maintenance (USDHHS, 2000), more research is warranted that examines the behavioral, normative, and control beliefs of both of these behaviors. In addition, research is needed that examines the TPB constructs (i.e., attitude, subjective norm, and perceived behavioral control) for predicting exercise and diet intention and behavior with populations at risk of physical inactivity, overweight, and obesity, and to determine what constructs may aid in intervention.

A second limitation of the exercise and diet TPB research is the lack of scale correspondence in the measures of intention and behavior (see Chapter 1 for a discussion of scale correspondence). Similar to Courneya and McAuley's (1993b) findings for exercise behavior, the most common violation of scale correspondence in the weight-loss and weight control studies was the use of a dichotomous-graded scale to measure intention and a continuous scale (i.e., continuous-open, continuous-closed verbal, continuous-closed numerical) to measure behavior (Bagozzi & Kimmel, 1995; Conner & Norman, 1996; Nguyen et al., 1996; Rodgers & Brawley, 1993; Schifter & Ajzen, 1985). A lack of scale correspondence violates the theoretical assumptions of the TPB, and it results in inconsistent predictions between the TPB constructs and behavior (Courneya, 1994; Courneya & McAuley, 1993b, 1994; Symons Downs & Hausenblas, 2002a).

Therefore, research using the TPB to examine exercise and diet intention and behavior should use measures that achieve scale correspondence.

Finally, few studies using the TPB have investigated exercise and diet with participants who are at risk of being inactive or overweight such as women (USDHHS, 2000). Most of the studies examining weight-loss and weight control were conducted with either student or general population samples (Bagozzi & Kimmel, 1995; Conner & Norman, 1996; Netemeyer et al., 1991; Schifter & Ajzen, 1985), and limited demographic information was provided that indicated if the participants were either overweight or sedentary. In summary, research is needed to prospectively examine the utility of the TPB for predicting exercise and diet intention and behavior with populations at risk of inactivity and overweight.

Thus, there were three purposes of this study. The first purpose was to prospectively examine the utility of the TPB for predicting exercise and diet behavior with two samples of overweight women. Based on previous research, it was hypothesized that (a) intention and perceived behavioral control would predict exercise and diet behavior, with intention being the strongest determinant of behavior (Hausenblas et al., 1997), and (b) attitude, subjective norm, and perceived behavioral control would predict exercise and diet intention, with attitude and perceived behavioral control being the strongest predictors of intention (Hausenblas et al.; Symons Downs & Hausenblas, 2002a).

The second purpose was to examine the relationships between the TPB constructs and their underlying beliefs. Consistent with the theoretical tenets of the TPB (Ajzen, 1991; Ajzen & Fishbein, 1980), it was predicted that overweight women's (a) behavioral beliefs would be positively associated with their attitude, (b) control beliefs would be positively correlated with their perceived behavioral control, and (c) normative beliefs would be positively related to their subjective norm.

Finally, the third purpose of this research was to determine the efficacy of the weight-loss intervention for improving participant's weight, body composition, and physical fitness. Based on the results from the elicitation study (Chapter 2), it was expected that (a) body mass index, percent body fat, and waist and hip circumferences would decrease from pre to postprogram; (b) resting heart rate, blood pressure, and cardiorespiratory fitness would improve from pre to postprogram; (c) there would be no differences in body mass index, percent body fat, and waist and hip circumferences from postprogram to the 1-month follow-up; and (d) body mass index, percent body fat, and waist and hip circumferences would decrease from preprogram to the 1-month follow-up.

Method

Participants

Sample one. Participants were 56 overweight and obese women between the ages of 31 and 62 (M = 43.70, SD = 7.90). Most of the participants were Caucasian (n = 52), followed by African American or Black (n = 2), American Indian (n = 1), and Hispanic or Latino (n = 1). About 73.2% of the women were married (n = 41), 66.1% had at least completed college (n = 37), 60.7% were employed full-time (n = 34), and 58.9% earned an annual household income of at least $60,000 (n = 33; see Table 3-1 for frequencies). In addition, the average weight, body mass index, percent body fat, and waist-to-hip ratio of the participants at the beginning of the weight-loss intervention was 176.25 pounds, 29.08, 31.82%, and 0.88, respectively (see Table 3-2 for M and SD scores).

Table 3-1
Demographic Profile of the Participants in Sample One

Characteristic	N	%
Ethnic Background		
African American/Black	2	3.6
American Indian	1	1.8
Caucasian	52	92.9
Hispanic/Latino	1	1.8
Highest Level of Education		
Completed high school	4	7.1
Some university/college	15	26.8
Completed university/college	10	17.9
Some graduate/professional school	10	17.9
Completed graduate/professional school	17	30.4
Marital Status		
Single/never married	1	1.8
Married	41	73.2
Common law	1	1.8
Divorced/separated	10	17.9
Widowed	2	3.6
Unknown	1	1.8
Annual Family Income		
Less than $20,000	1	1.8
$20,000-$39,000	8	14.3
$40,000-$59,000	13	23.2
$60,000-$79,000	21	37.5
More than $80,000	12	21.4
Unknown	1	1.8
Employment Status		
Unemployed	1	1.8
Part-time	10	17.9
Full-time	34	60.7
Retired	3	5.4
Homemaker	5	8.9
Other	3	5.4
Number of Children		
None	3	5.4
1-2 children	44	78.6
3-4 children	7	12.5
5-9 children	1	1.8
Unknown	1	1.8

Table 3-1. Continued

Characteristic	N	%
Number of Days Participants Weigh Themselves During Average Week		
None	24	42.9
1-2 days	19	33.9
3-4 days	6	10.7
5-6 days	3	5.4
7 days	4	7.1
Number of Weight Loss Attempts During Past 6 Months		
None	21	37.5
1-3 attempts	27	48.2
4-6 attempts	6	10.7
7-9 attempts	1	1.8
10 or more	1	1.8
Pounds Lost During Most Recent Weight Loss Attempt		
Not applicable	13	23.2
None	8	14.3
1-4 pounds	8	14.3
5-9 pounds	14	25.0
10 or more pounds	11	19.6
Unknown	2	3.6

Table 3-2
Mean (M) and Standard Deviation (SD) Scores of the Demographic Characteristics and the Leisure-Time Exercise Questionnaire for the Participants in Sample One

Variable	M	SD
Age	43.70	7.90
Height	65.29	2.69
Weight	176.25	34.03
Body Mass Index	29.08	5.24
Percent Body Fat	31.82	4.42
Waist	37.92	5.25
Hip	42.87	4.55
Percentage of Body Weight Lost (pre-post)	2.09	2.15
Leisure-Time Exercise Questionnaire Total (6 months ago)	26.89	63.14
Strenuous	6.87	11.09
Moderate	8.46	15.39
Mild	11.56	48.27
Leisure-Time Exercise Questionnaire Total (current)	21.47	17.19
Strenuous	9.00	11.49
Moderate	7.18	8.21
Mild	5.29	6.58

Note. Height and circumferences recorded in inches. Strenuous, moderate, and mild exercise reported in metabolic equivalents. Weight and body composition measurements represent preprogram measurements.

Sample two. Participants were 59 overweight and obese women between the ages of 18 and 36 (M = 21.58, SD = 3.68). Most of the women were Caucasian (n = 24), then African American or Black (n = 15), Hispanic or Latino (n = 11), Asian or Pacific Islander (n = 7), Multiracial (n = 1), and other (n = 1). About 72.9% had completed some university or college (n = 43), 86.4% were single or never married (n = 51), 42.4% earned less than $20,000 annually (n = 25), and 49.2% were employed part-time (n = 29; see Table 3-3 for frequencies). The average preprogram measurements of weight, body mass index, percent body fat, and waist-to-hip ratio for the sample were 170.04 pounds, 28.91, 30.11%, and 0.83, respectively (see Table 3-4 for M and SD scores).

Measures

Body mass index (BMI). BMI is a measure of weight relative to height, and it is calculated by dividing weight (kg) by height (m) squared. Direct measures of height and weight were obtained on a balance beam scale. The American College of Sports Medicine [ACSM] (2000) classifies individuals with a BMI of 25.0-29.9 kg/m^2 as overweight and individuals with a BMI greater than 29.9 kg/m^2 as obese. BMI is a reliable measure of obesity (Garrow & Webster, 1985), but should not be used to estimate percent body fat due to a ±5% standard error (ACSM).

Percent body fat. Baseline skinfold calipers were used to collect skinfolds from the following three sites: the tricep, suprailium, and thigh (Jackson & Pollack, 1985). Skinfolds are positively correlated with body fat percentage determined by hydrostatic weighing, and they are reliable estimates of percent body fat assuming proper techniques and formulas have been used (ACSM, 2000). However, a ±3.5% margin of error exists when using skinfolds to predict percent body fat. A healthy body fat percentage for women is 15% to 25% (Powers & Dodd, 2003) because obesity-related health risks rise as percent body fat increases to 30% (Heyward & Stolarczyk, 1996).

Circumference measures. Waist and hip circumferences were measured using a nonelastic tape measure, and they were recorded to the nearest quarter of an inch. The waist measurement was taken at the level of the umbilicus (i.e., navel), and the hip measurement was taken at the maximum circumference of the buttocks (Heyward & Stolarczyk, 1996; Powers & Dodd, 2003). In general, circumference measurements are good estimates of fat and lean body mass, and they are preferable to skinfold measurements in obese individuals (Heyward & Stolarczyk). Circumference

Table 3-3

Demographic Profile of the Participants in Sample Two

Characteristic	N	%
Ethnic Background		
African American/Black	15	25.4
Asian/Pacific Islander	7	11.9
Caucasian	24	40.7
Hispanic/Latino	11	18.6
Multiracial	1	1.7
Other	1	1.7
Highest Level of Education		
Completed high school	2	3.4
Some university/college	43	72.9
Completed university/college	3	5.1
Some graduate/professional school	11	18.6
Marital Status		
Single/never married	51	86.4
Engaged	3	5.1
Married	4	6.8
Common law	1	1.7
Annual Family Income		
Less than $20,000	25	42.4
$20,000-$39,000	7	11.9
$40,000-$59,000	11	18.6
$60,000-$79,000	3	5.1
More than $80,000	10	16.9
Unknown	3	5.1
Employment Status		
Unemployed	22	37.3
Part-time	29	49.2
Full-time	2	3.4
Other	6	10.2
Number of Children		
None	57	96.6
1-2 children	2	3.4
Number of Days Participants Weigh Themselves During Average Week		
None	33	55.9
1-2 days	10	16.9
3-4 days	8	13.6
5-6 days	5	8.5
7 days	3	5.1

Table 3-3. Continued

Characteristic	N	%
Number of Weight Loss Attempts During Past 6 Months		
None	12	20.3
1-3 attempts	36	61.0
4-6 attempts	6	10.2
7-9 attempts	2	3.4
10 or more	3	5.1
Pounds Lost During Most Recent Weight Loss Attempt		
Not applicable	9	15.3
None	8	13.6
1-4 pounds	16	27.1
5-9 pounds	12	20.3
10 or more pounds	14	23.7

Table 3-4

Mean (M) and Standard Deviation (SD) Scores of the Demographic Characteristics and the Leisure-Time Exercise Questionnaire for the Participants in Sample Two

Variable	M	SD
Age	21.58	3.68
Height	64.26	2.72
Weight	170.04	35.51
Body Mass Index	28.91	5.43
Percent Body Fat	30.11	5.40
Waist	34.84	4.40
Hip	42.03	4.23
Percentage of Body Weight Lost (pre-post)	1.40	1.92
Leisure-Time Exercise Questionnaire Total (6 months ago)	37.47	31.48
Strenuous	18.00	19.00
Moderate	13.20	13.39
Mild	6.27	6.94
Leisure-Time Exercise Questionnaire Total (current)	36.28	22.54
Strenuous	17.07	16.58
Moderate	11.70	10.49
Mild	8.14	7.31

Note. Height and circumferences recorded in inches. Strenuous, moderate, and mild exercise reported in metabolic equivalents. Weight and body composition measurements represent preprogram measurements.

measurements are associated with less error when compared with skinfold measurements because less technician skill is required (Heyward & Stolarczyk).

Waist-to-hip ratio (WHR). A WHR is an accurate method for predicting disease risk for coronary heart disease, diabetes, and hypertension because it indicates the way in which body fat is distributed (ACSM, 2000; Heyward & Stolarczyk, 1996). To calculate WHR, the circumference of the waist is divided by the circumference of the hips (ACSM; Heyward & Stolarczyk; Powers & Dodd, 2003). Women with a WHR greater than 0.80 have at least a moderately high risk of disease (Powers & Dodd). However, the accuracy of the WHR decreases with increasing levels of fatness (Heyward & Stolarczyk).

Blood pressure. Assessments of resting blood pressure and resting heart rate were measured with an Omron Automatic Digital Blood Pressure Monitor (HEM 725-C). Optimal systolic blood pressure is < 120 mm Hg and optimal diastolic blood pressure is < 80 mm Hg (ACSM, 2000). Individuals with systolic measures > 140 mm Hg or diastolic measures > 90 mm Hg were classified as hypertensive (ACSM). On average, resting heart rates are between 60-100 beats/min, with lower heart rates indicating greater cardiorespiratory fitness (Williams, 2000).

Cardiorespiratory fitness. Cardiorespiratory fitness was measured with a recovery index following a 3-min step test. The test was administered on a bench that was raised 12 inches off the floor (i.e., 4 risers on each side). Participants were instructed to step up and down continuously for 3 min at a pace of 30 complete steps (up/up, down/down) per min. The pace was established by an electric metronome (Tempus OM-30) and set at 60 tones/min. Postexercise heart rate was recorded 1 min, 2 min, and 3 min following the completion of the step test (Powers & Dodd, 2003). Step testing using postexercise recovery heart rates is a reliable method of cardiorespiratory fitness (ACSM, 2000), and it has a mean prediction error of 12.4% (McConnell, 1998). Lower scores indicate greater cardiorespiratory fitness.

Physical Activity Readiness Questionnaire (PAR-Q). The PAR-Q is a seven-item questionnaire that assesses an individual's readiness to begin moderate-intensity physical activity (ACSM, 2000; see Appendix I). Answers of "yes" indicate possible limitations for beginning a physical activity program. The PAR-Q was administered to all participants who requested a spot in one of the weight-loss programs. If the participants responded "yes" to any of the seven items they were required to obtain written permission from their health care provider to continue with the research.

Personal History Questionnaire. The Personal History Questionnaire was developed for the elicitation study (Chapter 2), and it included information on the participants' age, height, weight, race or ethnic background, education, marital status, annual family income, employment status, number of children, number of days they weigh themselves, past weight loss attempts, and pounds lost during their most recent weight loss attempt (see Appendix B).

Leisure-Time Exercise Questionnaire (LTEQ). The LTEQ measures self-reported leisure-time exercise performed during an average week (Godin, Jobin, & Bouillon, 1986; Godin & Shephard, 1985; see Appendix C). Participants recorded the number of times they completed at least 15 min of mild exercise (e.g., walking, yoga), moderate exercise (e.g., fast walking, easy swimming), and strenuous exercise (e.g., jogging, aerobics classes). The total score is weighted in metabolic equivalents (METs) and is calculated by multiplying the frequencies of mild exercise by 3, the frequencies of moderate exercise by 5, and the frequencies of strenuous exercise by 9 and summing the three subscales. The LTEQ is a valid and reliable measure of exercise (Jacobs, Ainsworth, Hartman, & Leon, 1993). Participants recorded their current exercise behavior and their exercise behavior six months before beginning the weight-loss program.

Attitude. Attitude towards exercise behavior was measured by eight semantic differential scales that tapped both the instrumental and affective aspect of attitude (Ajzen, 1991; Courneya, Blanchard, & Laing, 2001; Courneya, Bobick, & Schinke, 1999;

see Appendix J). The statement, "Attending the group exercise class 12 times over the next 4 weeks to lose weight will be" was rated on 7-point scales. The scales were anchored by the adjectives for instrumental attitude (useless-useful, harmful-beneficial, foolish-wise, bad-good) and affective attitude (boring-interesting, unpleasant-pleasant, unenjoyable-enjoyable, and stressful-relaxing). For sample one and two, the eight-item exercise attitude scales had alpha coefficients of .84 and .74, respectively. The same procedure was used to assess attitude towards diet behavior. The same adjective pairs were preceded by the statement, "Adhering to the diet for 28 days over the next 4 weeks to lose weight will be." For sample one and two, the eight-item diet attitude scales had alpha coefficients of .79 and .80, respectively. Higher scores indicate a more favorable attitude towards exercise and diet behavior.

Subjective norm. Three items were used to measure exercise subjective norm (Courneya, Blanchard, et al., 2001; Courneya, Friedenreich, Arthur, & Bobick, 1999; see Appendix K). The statements, "Most people who are important to me think I should attend the group exercise classes 12 times over the next 4 weeks to lose weight," "Most people who are important to me approve of me attending the group exercise class 12 times over the next 4 weeks to lose weight," and "Most people who are important to me will support me attending the group exercise class 12 times over the next 4 weeks to lose weight" were rated on 7-point scales ranging from 1 (strongly disagree) to 7 (strongly agree). The three-item exercise subjective norm scale had an alpha coefficient of .87 for sample one and .79 for sample two. The three items were reworded to assess diet subjective norm, "Most people who are important to me think I should adhere to the diet for 28 days over the next 4 weeks to lose weight," "Most people who are important to me approve of me adhering to the diet for 28 days over the next 4 weeks to lose weight," and "Most people who are important to me will support me adhering to the diet for 28 days over the next 4 weeks to lose weight." The three-item diet subjective norm scale had an alpha coefficient of .89 for sample one and .83 for sample two. Higher scores reflect greater subjective norm.

Perceived behavioral control. Three items were used to assess perceived behavioral control for exercise behavior (Courneya, Blanchard, et al., 2001; Courneya & Friedenreich, 1999; see Appendix L). The items were rated on 7-point scales (e.g., 1-7) and included, "How much control do you have over attending the group exercise class 12 times over the next 4 weeks to lose weight" (very little control-complete control), "For me to attend the group exercise class 12 times over the next 4 weeks to lose weight will be" (extremely difficult-extremely easy), and "If I wanted to, I could easily attend the group exercise class 12 times over the next 4 weeks to lose weight" (strongly disagree-strongly agree). The alpha coefficients for exercise perceived behavioral control were .84 and .89 for sample one and two respectively. The three items for diet behavior were "How much control do you have over adhering to the diet for 28 days over the next 4 weeks to lose weight," "For me to adhere to the diet for 28 days over the next 4 weeks to lose weight will be," and "If I wanted to, I could easily adhere to the diet for 28 days over the next 4 weeks to lose weight." The alpha coefficients for diet perceived behavioral control were .79 and .77 for sample one and two respectively. Higher scores indicate stronger perceptions of control over exercise and diet behavior.

Intention. Four types of scales were used to measure the participants' exercise intention (Courneya, Blanchard, et al., 2001; Courneya, Friedenreich, et al., 1999;

Courneya, Nigg, & Estabrooks, 1998; see Appendix M). The item, "To lose weight, my goal over the next 4 weeks is to attend 12 group exercise classes" was rated on a 7-point dichotomous-graded scale ranging from 1 (strongly disagree) to 7 (strongly agree). A continuous-closed (verbal) scale was used for the item "To lose weight, my goal over the next 4 weeks is to attend the group exercise class" and was assessed by the ratings of 1 (not at all), 3 (some of the time), 5 (most of the time), and 7 (every class). The item, "To lose weight, my goal over the next 4 weeks is to attend the following number of group exercise classes" was rated on a continuous-closed (numerical) scale with seven different points including 1 (0 to 1 classes), 2 (2 to 3 classes), 3 (4 to 5 classes), 4 (6 to 7 classes), 5 (8 to 9 classes), 6 (10 to 11 classes), and 7 (12 classes). Finally, participants were asked to insert a number between 0 and 12 into the blank for the continuous-open scale, "To lose weight, my goal over the next 4 weeks is to attend the group exercise class _____ times." The same scales were reworded to measure diet intention, "To lose weight, my goal over the next 4 weeks is to adhere to the diet for 28 days" (1 = strongly disagree; 7 = strongly agree), "To lose weight, my goal over the next 4 weeks is to adhere to the diet" (1 = not at all, 3 = some of the time, 5 = most of the time, 7 = everyday), "To lose weight, my goal over the next 4 weeks is to adhere to the diet the following number of days" (1 = 0 to 4 days, 2 = 5 to 8 days, 3 = 9 to 12 days, 4 = 13 to 16 days, 5 = 17 to 20 days, 6 = 21 to 24 days, 7 = 25 to 28 days), and "To lose weight, my goal over the next 4 weeks is to adhere to the diet _____ days" (please insert a number between 0 and 28). Higher scores reflect stronger exercise and diet intention.

Three different intention measures were developed for exercise and diet. Intention A included the average of the three 7-point scales (i.e., dichotomous-graded, continuous-closed [verbal], and continuous-closed [numerical] scales). For sample one, the internal consistency score for the three-item exercise intention A scale was .65, and it was .72 for the diet intention A scale. For sample two, the alpha coefficients were .90 for exercise intention A and .78 for diet intention A. Intention B was the continuous-open item. A single item to measure intention is common in the literature and consistent with the TPB (Ajzen, 1991; Courneya & McAuley, 1993b; Courneya & Friedenreich, 1997, 1999). Finally, intention C was the average of the four intention scales after they were converted to $\underline{z}$ scores. $\underline{Z}$ scores were calculated because of the different metrics of the scales (Courneya, Blanchard, et al., 2001). For sample one, the alpha coefficients for the exercise and diet intention C scales were .82 and .80, respectively. For sample two, the alpha coefficients were .93 for the exercise intention C scale and .85 for the diet intention C scale. Scale correspondence was achieved by using a continuous-open scale and a continuous-closed (numerical) scale to assess intention and behavior (Courneya, 1994).

Behavioral beliefs. The most salient exercise behavioral advantages that emerged during the elicitation study (see Chapter 2) were to (a) improve my physical appearance, (b) improve my psychological well-being, (c) improve my fitness level, (d) create a healthier lifestyle, (e) increase my motivation, and (f) increase my energy. The statement "Attending the group exercise class 12 times over the next 4 weeks to lose weight will help me to" preceded each behavioral belief (Courneya & Friedenreich, 1997, 1999; see Appendix N). Internal consistency for the six-item scale for sample one was good ($\alpha = .91$). For sample two, a five-item scale was used (increases energy was not elicited) and the internal consistency was good ($\alpha = .71$). A similar statement was used for the diet behavioral advantages. "Adhering to the diet for 28 days over the next 4 weeks to lose weight will help me to" preceded three salient diet beliefs that included (a) improve my eating habits, (b) improve my physical appearance, and (c) improve my psychological well-being (Courneya & Friedenreich). The internal consistency for the three-item diet behavioral belief scale for sample one was .77 and was .63 for sample two. The behavioral beliefs were rated on 7-point scales ranging from 1 (extremely unlikely) to 7 (extremely likely). Outcome evaluation was examined by the statement "How important are each of the following outcomes for you during your exercise and diet program over the next 4 weeks?" and was also rated on 7-point scales ranging from 1 (extremely unimportant) to 7 (extremely important; Courneya & Friedenreich). Alpha coefficients for the exercise (i.e., 6 items) and diet outcome evaluation scales for sample one were .90 and .76, respectively. For sample two, the alpha coefficients for the outcome evaluation scale for exercise (i.e., 5 items) and diet were .79 and .53, respectively. Each behavioral belief was multiplied by the corresponding outcome evaluation and summed for a belief-based measure of attitude (Ajzen, 1991).

Control beliefs. The most common obstructing factors of exercise resulting from the elicitation study (see Chapter 2) were (a) having to stick to the prearranged time for the workout; (b) lack of support; (c) experiencing physical ailments (i.e., headaches, muscle soreness, hunger); (d) lack of variety in the exercise activities; (e) having no time to exercise; (f) having job or school responsibilities; (g) having to travel; (h) having family responsibilities; (i) having no motivation to exercise; and (j) experiencing fatigue or tiredness. Each of the control beliefs were preceded by the statement "How difficult will it be for you to attend the group exercise class 12 times over the next 4 weeks to lose weight given the following circumstances?" (Courneya & Friedenreich, 1997, 1999; see

Appendix O). For sample one, a nine-item exercise scale (lack of support was not elicited) had an internal consistency of .90. An eight-item exercise scale (having family responsibilities and having no motivation to exercise were not elicited) for sample two had an internal consistency of .84. The most salient obstructing factors of diet behavior that emerged from the elicitation study (see Chapter 2) were (a) inconvenience of following the diet within your normal routine; (b) experiencing physical ailments (i.e., hunger, headaches, tiredness); (c) lack of variety in food choices; (d) lack of freedom to eat out; (e) lack of freedom to eat your favorite foods; (f) having temptations to eat foods not included in the diet; (g) having to attend social situations that involve food; (h) dissatisfaction with the food; (i) having job responsibilities; (j) experiencing mood disturbances; and (k) having little time to eat, record, and prepare the foods included in the diet. Each of the diet control beliefs were preceded by the statement "How difficult will it be for you to adhere to the diet for 28 days over the next 4 weeks to lose weight given the following circumstances?" (Courneya & Friedenreich). Internal consistency for the 11-item diet scale was .91 for sample one. For sample two, the 10-item diet scale (experiencing physical ailments was not elicited) had an internal consistency of .87. All control beliefs were rated on 7-point scales ranging from 1 (extremely difficult) to 7 (extremely easy). Perceived power was assessed by the statements "How strongly will each item influence you attending the group exercise 12 times/adhering to the diet for 28 days over the next 4 weeks to lose weight?" and were also rated on 7-point scales ranging from 1 (extremely weak) to 7 (extremely strong; Courneya & Friedenreich). Percieved power for exercise had an alpha coefficient of .93 for sample one (i.e., 9 items) and .83 for sample two (i.e., 8 items). Perceived power for diet had an alpha coefficient of .93 (i.e., 11 items) for sample one and .87 (i.e., 10 items) for sample two. Each control belief was multiplied by its corresponding rating of perceived power and the products were summed to construct a belief-based measure of perceived behavioral control (Ajzen, 1991).

Normative beliefs. The five salient referent groups for exercise that resulted from the elicitation study (see Chapter 2) included (a) the program trainers, (b) family, (c) friends, (d) group members, and (e) spouse or significant other. Each of the five normative beliefs were preceded by the statement "How strongly will each of the following people approve or disapprove of you attending the group exercise class 12 times over the next 4 weeks to lose weight?"(Courneya & Friedenreich, 1997, 1999; see Appendix P). The internal consistencies for the five-item exercise scale were .79 for sample one and .84 for sample two. The referent groups for diet behavior were the same as for exercise and were preceded by the statement "How strongly will each of the following people approve or disapprove of you adhering to the diet for 28 days over the next 4 weeks to lose weight?" (Courneya & Friedenreich). The internal consistencies for the five-item diet scale were .81 for sample one and .87 for sample two. All normative beliefs were rated on 7-point scales ranging from 1 (strongly disapprove) to 7 (strongly approve). Motivation to comply was assessed by the statement "How important is it for you to do what each of these people approve of during the exercise and diet program over the next 4 weeks?" and was also rated on 7-point scales ranging from 1 (extremely unimportant) to 7 (extremely important; Courneya & Friedenreich). The alpha coefficients for samples one and two were .89 and .86, respectively. Each normative belief was multiplied by the motivation to comply rating for each referent and summed for a belief-based measure of subjective norm (Ajzen, 1991).

Exercise behavior. Attendance of the exercise classes during the four weeks served as the measure of exercise behavior and was maintained by the program trainer (see Appendix Q). The total number of classes attended is an objective measure of exercise behavior (i.e., continuous-open scale; Sallis & Saelens, 2000). Exercise behavior was also recorded on a continuous-closed (numerical) scale.

Diet behavior. Participants completed daily food logs by marking the items from the menus they consumed and recording any foods not listed on the menus that they consumed (see Appendix R). Daily adherence was achieved if participants consumed within ±100 calories of the calorie goal (i.e., 1500). Two independent raters (the principal investigator and a patient nutrition representative from a local hospital) coded the participants' daily food logs. Initial inter-rater agreements of 96.2% and 98.1% were achieved for sample one and two, respectively. For food logs that were coded differently, both raters examined the food log together, discussed the coding, and made appropriate changes when necessary. The total number of days out of 28 possible days the participants adhered to the diet was the measure of diet behavior (i.e., continuous-open scale). Diet behavior was also recorded on a continuous-closed (numerical) scale.

Procedure

Recruitment of sample one. An advertisement for a 4-week weight-loss program was posted during the summer and fall months at a local YMCA and published in monthly mailings that were sent to current YMCA members (see Appendix S). One hundred and seventy-two women requested information about the program. Of these women, 61 (35.5%) were unable to participate in the program because they never returned the program trainer's contact (n = 27), they were not members of the YMCA (n = 17), they reported scheduling conflicts with the time of the exercise classes (n = 10), they lost interest in the program (n = 6), or they reported severe physical limitations (n = 1).

One hundred and eleven (64.5%) interested participants provided their first and last name, their age, an email address (if applicable), a phone number, and responded to the seven-item PAR-Q on the telephone. Each participant was assigned to one of the four monthly weight-loss programs that were offered (i.e., July 15 to August 19, August 26 to September 30, October 14 to November 18, and November 11 to December 18). Each monthly program was capped at 23 participants due to space and equipment limitations. Participants were placed on a waiting list if the program they requested was full. Initially, 41 (36.9%) participants were placed on a waiting list.

Of the 111 participants who responded to the PAR-Q, 34 (30.6%) women withdrew from the program by contacting the program trainer either before the orientation meeting (n = 15), after missing the orientation meeting (n = 5), or after attending the orientation meeting (n = 14). In addition, eight (7.2%) women were classified as dropouts when they failed to attend the orientation meeting and did not contact the program trainer. Participants on the waiting lists filled available spots at the beginning of the program. Finally, three (2.7%) women who were assigned to a waiting list were not contacted because of lack of space availability.

The remaining 66 (59.5%) women attended orientation and completed the initial fitness assessment for one of the 4-week programs. Participants with a "yes" response on the PAR-Q were instructed to provide documentation at the program orientation from their physician or health care provider that stated they were clear to participate in the program. Ten participants (15.2%) responded "yes" to at least one of the items and all provided sufficient documentation. For the purpose of the research study, only participants with a BMI greater than 24.9 (indicating overweight or obesity) or a WHR greater than 0.80 (indicating a moderate to high risk of disease) were included in the sample. Six women were eliminated from the sample because they did not meet either of these requirements. Three participants who met the BMI requirement were eliminated from the final sample because they were students, and they were not considered representative of the sample. Finally, one woman who met the BMI requirement was deleted from the final sample because she was significantly older than the remaining participants. Thus, the final sample included 56 overweight and obese adult women.

Recruitment of sample two. Advertisements for a 4-week weight-loss program were posted on the campus Student Recreation Fitness Center's (SRFC) website and were included in the schedule of group exercise classes that was distributed at the beginning of the summer and fall semesters (see Appendices T and U). Two hundred and forty women requested information about the program. Of these women, 118 (49.2%) were unable to participate in the program because they failed to return the program trainer's contact ($n = 61$), they reported scheduling conflicts with the exercise classes ($n = 50$), or because they were not students at the university ($n = 7$).

One hundred and twenty-two (50.8%) interested students provided their first and last name, their age, an email address (if applicable), a phone number, and responded to the seven-item PAR-Q during the telephone interview. Each participant was subsequently assigned to one of the four monthly programs that were offered (i.e., June 17 to July 29, September 3 to October 7, September 23 to November 4, and October 21 to December 9). Each monthly program was capped at 30 participants due to space and equipment limitations, and no waiting list was necessary for any of the four programs.

Of the 122 students who completed the PAR-Q, 39 (31.9%) participants withdrew from the program either by contacting the program trainer before the orientation meeting ($\underline{n}$ = 16), after missing the orientation meeting ($\underline{n}$ = 10), or after attending the orientation meeting ($\underline{n}$ = 13). Additionally, seven (5.7%) students were considered dropouts for failing to attend the orientation meeting and not contacting the program trainer.

The remaining 76 (62.3%) students attended the orientation meeting and completed the first fitness assessment for one of the 4-week programs. Students who responded "yes" to any of the seven items on the PAR-Q were instructed to provide documentation at the program orientation from their physician or health care provider that stated they were clear to participate in the program. Only one student answered "yes" to at least one of the items, and she provided sufficient documentation. For the purpose of the research study, participants were included in the data analyses if they had a BMI greater than 24.9 (indicating overweight or obesity) or had a WHR greater than 0.80 (indicating a moderate to high risk of disease). Sixteen students were eliminated from the sample because they did not meet either of these requirements. Finally, one student who met the BMI requirement was eliminated from the sample because she was significantly older than the remaining participants. Therefore, 59 overweight and obese female university students were included in the final sample.

One week before the orientation meeting, an email was sent reminding the participants about orientation (phone calls were made if no email address was provided). Participants were instructed to bring a pen or pencil, their dayplanners or calendars, and physician notes if required. A second email reminder was sent to all participants one day before the orientation meeting.

Orientation week. Orientation was held between one and two weeks before the start of the exercise classes and the diet. At orientation, the information regarding the diet and exercise was explained and questions were addressed. Participants spent about 30 min completing the informed consent document (see Appendices G and H), as well as the Personal History Questionnaire, the LTEQ, and TPB items. Appointments for fitness assessments were also made at this time.

Fitness assessments were conducted before the start of the exercise classes. Fitness assessments lasted about 20 min, and they included measures of height, weight, percent body fat, blood pressure, resting heart rate, and cardiorespiratory fitness. Participants with a BMI greater than 34.9 (class II or class III obesity) did not have skinfold measurements taken ($n = 8$ sample one, $n = 6$ sample two), as well as any individuals who were not dressed appropriately ($n = 1$ sample two). Additionally, participants were prohibited from performing the step-test if they were classified as hypertensive ($n = 8$ sample one, $n = 1$ sample two), reported physical limitations ($n = 3$ sample one, $n = 5$ sample two), and if they did not wear proper footwear ($n = 1$ sample one, $n = 1$ sample two). Several participants started the step-test, but discontinued because of poor conditioning ($n = 14$ sample one, $n = 6$ sample two) or because they could not maintain the proper pace (n = 12 sample one, n = 3 sample two). Email reminders were sent to each participant the day before their appointments.

The weight-loss program. The group exercise classes and the diet began either the Monday (sample two) or Tuesday (sample one) after orientation. The group exercise classes met every Monday, Wednesday, and Friday (sample two) or every Tuesday, Thursday, and Saturday (sample one) for 4 weeks[1]. Each class was 75 min in duration. During the first 15 min, attendance was recorded, food logs were collected, and questions and concerns were addressed. Two times a week, the next 30 min of class were devoted to resistance or calisthenic exercises that focused on the abdominals (crunches, stabilizers), arms (bicep curls, overhead press, pushups, dips, lateral raise), and legs (wall squats, lunges, leg lifts, leg circles). The remaining 30 min were for cardiorespiratory exercise (indoor machines or outdoor group walk). One day a week, 60 min of the exercise class were for circuit training. This included alternating stations of cardiorespiratory exercise (step, jump rope, shuttle run, slide) and resistance or calisthenic exercises. Each station lasted between 1 and 3 min.

The diet contained seven days of menus that were repeated four times for 28 days. The menus were broken into six meals a day, and they were based on a 1500-calorie diet.

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[1] The October-November and November-December weight-loss groups at the YMCA, and the November-December weight-loss group at the SRFC did not meet three times a week for 4 weeks. The schedule had to be altered because of Halloween, Veteran's Day, and Thanksgiving holidays and resulted in 11 maximum group exercise classes. For these groups, all of the exercise TPB questions (i.e., attitude, subjective norm, perceived behavioral control, intention, behavioral beliefs, control beliefs, and normative beliefs) were reworded to reflect the change in total exercise classes (i.e., from 12 to 11).

The daily caloric breakdown was about 50% to 60% carbohydrate, 20% to 25% protein, and 20% to 25% fat (see Chapter 2 for more information about the diet).

Exit week. An exit meeting was held within a few days of the final group exercise class. Exit meeting email reminders were sent one day before the meeting. Participants signed up for their second fitness assessment that took place during the exit week and returned their last food logs. The second fitness assessment was identical to the first assessment. Participants also scheduled appointments for their third fitness assessment that occurred 4 weeks later. Participants were emailed their results from the first two fitness assessments within 2 weeks of the exit meeting.

Follow-up fitness assessments. Four weeks after the program, the follow-up fitness assessments of weight, percent body fat, and circumferences were collected. Questions regarding the objectives of the research were addressed at this time. Participant payment information was collected, and a monetary reimbursement of $25.00 was mailed within 4 to 6 weeks.

Data Analysis

Internal consistencies were used for the study variables, and descriptive statistics were used to describe the sample characteristics. To analyze the first purpose of this study (i.e., the utility of the TPB for predicting exercise intention and behavior with overweight women), multiple hierarchical regression analyses (HRA) with forced entry within each block were conducted. The order and content of the blocks of predictors were based on the theoretical tenets of the TPB and previous research (Ajzen, 1991; Courneya & Friedenreich, 1997, 1999; Symons Downs & Hausenblas, 2002a). To predict either exercise or diet behavior, behavior was regressed on intention (Block 1), followed by perceived behavioral control (Block 2). To predict either exercise or diet intention, intention was regressed on attitude and subjective norm (Block 1) and perceived behavioral control (Block 2).

To examine the second purpose of this study, Pearson correlations were conducted to assess the association between attitude and behavioral beliefs, perceived behavioral control and control beliefs, and subjective norm and normative beliefs. Finally, to analyze the third purpose, repeated measures analyses of variance (ANOVA) with Bonferroni post hoc comparisons were undertaken to determine if significant changes in BMI, percent body fat, waist and hip circumferences, resting heart rate, blood pressure, and cardiorespiratory fitness occurred from pre to postprogram, from postprogram to the 1-month follow-up, and from preprogram to the 1-month follow-up.

Eta squared (η^2) was calculated to determine the meaningfulness of the results with .20, .50, and .80 representing small, medium, and large effects, respectively (Cohen, 1969, 1992). An a priori estimation of sample size was determined based on an alpha level of .05, a medium effect size, and a power of .80 (Green, 1991). The final sample sizes provide adequate power to detect large effects for the regression analyses, but are smaller than recommended to detect medium effects (Green). Finally, all statistical tests were conducted with alpha set at .05.

Results

Sample One

Participants versus individuals who withdrew from the program. An independent samples t-test was conducted to determine if any significant differences existed between the final sample of participants and the individuals who withdrew from the program after attending the program orientation (n = 14) on demographic characteristics, current exercise behavior, the TPB constructs, and beliefs. No significant differences were found between the groups.

Descriptive statistics for exercise behavior. Descriptive statistics for previous exercise behavior indicated that six months before the weight-loss intervention the participants reported 0.00 to 360.00 METs (M = 11.56, SD = 48.27) of mild exercise, 0.00 to 100.00 METs (M = 8.46, SD = 15.39) of moderate exercise, and 0.00 to 36.00 METs (M = 6.87, SD = 11.09) of strenuous exercise per week. Participants also reported 0.00 to 21.00 METs (M = 5.29, SD = 6.58) of mild exercise, 0.00 to 25.00 METs (M = 7.18, SD = 8.21) of moderate exercise, and 0.00 to 36.00 METs (M = 9.00, SD = 11.49) of strenuous exercise per week just before beginning the weight-loss program (see Table 3-2).

Descriptive statistics for the TPB constructs and beliefs. On the 7-point scales, the participants reported a positive exercise (M = 6.15, SD = 0.59) and diet (M = 5.76, SD = 0.61) attitude, a positive exercise (M = 6.12, SD = 1.12) and diet (M = 6.17, SD = 1.04) subjective norm, a positive exercise (M = 5.56, SD = 1.26) and diet (M = 5.43, SD = 1.07) perceived behavioral control, and a positive exercise (M = 6.43, SD = 0.64) and diet (M = 6.49, SD = 0.64) intention. Participants also held positive exercise (M = 6.38, SD = 0.75) and diet (M = 6.28, SD = 0.85) behavioral beliefs, positive exercise (M = 6.46, SD = 0.72) and diet (M = 6.42, SD = 0.74) normative beliefs, and positive exercise (M = 5.33, SD = 1.24) and diet (M = 4.70, SD = 1.21) control beliefs (see Table 3-5).

Table 3-5

Mean (M), Standard Deviation (SD) Scores, and Reliabilities (α) of the Theory of Planned Behavior Constructs for Sample One

Construct	M	SD	α
Exercise			
Attitude	6.15	0.59	.84
Subjective norm	6.12	1.12	.87
Perceived behavioral control	5.56	1.26	.84
Intention A	6.43	0.64	.65
Intention B*	10.84	1.01	
Intention C	0.01	0.80	.82
Behavioral beliefs	6.38	0.75	.91
Control beliefs	5.33	1.24	.90
Normative Beliefs	6.46	0.72	.79
Diet			
Attitude	5.76	0.61	.79
Subjective norm	6.17	1.04	.89
Perceived Behavioral Control	5.43	1.07	.79
Intention A	6.49	0.64	.72
Intention B*	26.27	3.18	
Intention C	0.03	0.78	.80
Behavioral Beliefs	6.28	0.85	.77
Control Beliefs	4.70	1.21	.91
Normative Beliefs	6.42	0.74	.81

Note. *The intention B scale was a one-item scale. Intention A was the average of the three 7-point scales. Intention B was the continuous-open item. Intention C was the average of all four intention measures after conversion to z scores.

Body composition and physical fitness measures. Results of the repeated measures ANOVAs revealed that the participants significantly reduced their BMI, Wilks' Lambda = .50, F (2, 44) = 22.08, $p < .001$, $\eta^2 = .50$; percent body fat, Wilks' Lambda = .23, F (2, 37) = 63.33, $p < .001$, $\eta^2 = .77$; waist circumference, Wilks' Lambda = .79, F (2, 44) = 5.81, $p = .006$, $\eta^2 = .21$; and hip circumference, Wilks' Lambda = .74, F (2, 44) = 7.64, $p = .001$, $\eta^2 = .26$. The post-hoc analyses revealed that BMI and percent body fat were significantly reduced from pre to postprogram, from postprogram to the 1-month follow-up, and from preprogram to the 1-month follow-up. Hip circumference significantly decreased from pre to postprogram and from preprogram to the 1-month follow-up. Waist circumference was significantly reduced from preprogram to the 1-month follow-up. Finally, participants lost 2.1% of their initial body weight by the end of the program. No other results were significant (see Table 3-6).

Table 3-6

Mean (M) and Standard Deviation (SD) Scores for the Body Composition and Physical Fitness Measurements from Pre to Postprogram and Postprogram to 1-Month Follow-Up for Sample One

	Pre	Post	Follow-Up
Measurement	M (SD)	M (SD)	M (SD)
Body mass index	29.44$_a$ (5.20)	28.82$_b$ (5.06)	28.61$_c$ (5.08)
Percent body fat	32.20$_a$ (4.55)	29.34$_b$ (4.23)	28.28$_c$ (3.85)
Waist	38.41$_a$ (5.04)	37.93 (5.10)	37.44$_b$ (4.66)
Hip	43.21$_a$ (4.45)	42.70$_b$ (4.25)	42.63$_b$ (4.22)
Resting heart rate	76.84 (9.92)	74.35 (9.73)	
Diastolic blood pressure	78.46 (8.82)	77.23 (9.32)	
Systolic blood pressure	123.69 (15.29)	122.96 (15.31)	
Recovery heart rate index	147.43 (30.11)	140.14 (30.49)	

Note. Means in the same row with different subscripts differ significantly at $p < .01$.

Exercise TPB constructs and beliefs associations. The attitude-behavioral beliefs ($r = .43$, $p = .001$), perceived behavioral control-control beliefs ($r = .68$, $p < .001$), and subjective norm-normative beliefs ($r = .39$, $p = .006$) associations were significant. Intention A was positively associated with attitude ($r = .35$, $p = .008$), behavioral beliefs, ($r = .34$, $p = .009$), normative beliefs ($r = .40$, $p = .004$), perceived behavioral control ($r = .72$, $p < .001$), and control beliefs ($r = .37$, $p = .006$). Intention B was positively related to attitude ($r = .28$, $p = .04$), normative beliefs ($r = .31$, $p = .03$), perceived behavioral control ($r = .64$, $p < .001$), and control beliefs ($r = .42$, $p = .002$). Finally, intention C was positively correlated with attitude ($r = .34$, $p = .01$), behavioral beliefs ($r = .34$, $p = .01$), normative beliefs ($r = .37$, $p = .009$), perceived behavioral control ($r = .75$, $p < .001$), and control beliefs ($r = .40$, $p = .003$). Only subjective norm was positively associated with behavior one ($r = .32$, $p = .02$) and behavior two ($r = .32$, $p = .02$). Finally, BMI was positively correlated with subjective norm ($r = .37$, $p = .006$; see Table 3-7).

Diet TPB constructs and beliefs associations. The attitude-behavioral beliefs ($r = .32$, $p = .02$), perceived behavioral control-control beliefs ($r = .59$, $p < .001$), and subjective norm-normative beliefs ($r = .36$, $p = .01$) associations were significant. Intention A was positively associated with attitude ($r = .53$, $p < .001$), behavioral beliefs ($r = .45$, $p = .001$), subjective norm ($r = .56$, $p < .001$), perceived behavioral control ($r = .52$, $p < .001$), and control beliefs ($r = .36$, $p = .01$). Intention B was positively correlated with attitude ($r = .42$, $p = .002$) and subjective norm ($r = .41$, $p = .002$). Intention C was significantly related to attitude ($r = .52$, $p < .001$), behavioral beliefs ($r = .36$, $p = .008$), subjective norm ($r = .54$, $p < .001$), perceived behavioral control ($r = .44$, $p = .001$), and control beliefs ($r = .28$, $p = .05$). Finally, BMI was significantly correlated with attitude ($r = .33$, $p = .02$) and subjective norm ($r = .36$, $p = .007$; see Table 3-8).

Predicting exercise intention. In the first regression model, attitude and subjective norm (Block 1) explained 15.5% of the variance in intention A (dependent variable), F

Table 3-7

Pearson Correlations Among the Exercise Theory of Planned Behavior Constructs, Beliefs, Behavior, Age, and Body Mass Index for Sample One

	2	3	4	5	6	7	8	9	10	11	12	13
1. Attitude	.43**	.35**	.40**	.55**	.45**	.35**	.28*	.34*	.07	.11	.75	.01
2. Behavioral beliefs	-	.23	.37**	.48**	.35*	.34**	.25	.34*	.17	.17	-.10	.01
3. Subjective norm		-	.39**	.35*	.27	.25	.16	.22	.32*	.32*	.05	.37**
4. Normative beliefs			-	.46**	.46**	.40**	.31*	.37**	-.01	.01	.14	.10
5. Perceived behavioral control				-	.68**	.72**	.64**	.75**	.23	.24	-.08	.23
6. Control beliefs					-	.37**	.42**	.40**	.23	.23	.12	.09
7. Intention A						-	.71**	.96**	.20	.17	-.00	.08
8. Intention B							-	.88**	.21	.22	.06	.18
9. Intention C								-	.23	.21	-.00	.10
10. Behavior 1									-	.97**	.15	.13
11. Behavior 2										-	.15	.20
12. Age											-	.15
13. Body mass index												-

Note. *$p < .05$. **$p < .01$. Intention A was the average of the three 7-point scales. Intention B was the continuous-open item. Intention C was the average of all four intention measures after conversion to z scores. Behavior 1 was the continuous-closed (numerical) item. Behavior 2 was the continuous-open item.

Table 3-8

Pearson Correlations Among the Diet Theory of Planned Behavior Constructs, Beliefs, Behavior, Age, and Body Mass Index for Sample One

	2	3	4	5	6	7	8	9	10	11	12	13
1. Attitude	.32*	.55**	.24	.59**	.54**	.53**	.42*	.52*	.07	.09	.08	.33*
2. Behavioral beliefs	-	.49**	.35*	.52**	.42**	.45**	.17	.36**	.10	.12	-.17	.13
3. Subjective norm		-	.36*	.42**	.19	.56**	.141**	.54**	.04	.06	-.03	.36**
4. Normative beliefs			-	.49**	.25	.25	.24	.24	.23	.20	.06	.09
5. Perceived behavioral control				-	.59**	.52**	.27	.44**	-.06	-.06	-.20	.27
6. Control beliefs					-	.36*	.16	.28*	.10	.12	.15	.14
7. Intention A						-	.57**	.94**	.04	.06	.09	.16
8. Intention B							-	.82**	-.04	-.02	.02	.11
9. Intention C								-	.01	.03	.09	.14
10. Behavior 1									-	.98**	.18	.04
11. Behavior 2										-	.14	.05
12. Age											-	.15
13. Body mass index												-

Note. *p < .05. **p < .01. Intention A was the average of the three 7-point scales. Intention B was the continuous-open item. Intention C was the average of all four intention measures after conversion to z scores. Behavior 1 was the continuous-closed (numerical) item. Behavior 2 was the continuous-open item.

(2, 49) = 4.50, $\underline{p} = .02$. Perceived behavioral control (Block 2) explained an additional 36.4% of the variance in intention A, $\underline{F}_{change}$ (1, 48) = 36.37, $\underline{p} < .001$, with perceived behavioral control ($\beta = .74$, $\underline{p} < .001$) emerging as the only significant predictor of intention A.

In the second regression model, attitude and subjective norm (Block 1) explained 7.7% of the variance in intention B (dependent variable), $\underline{F}$ (2, 48) = 2.01, $\underline{p} = .15$. Perceived behavioral control (Block 2) explained an additional 34.6% of the variance in intention B, $\underline{F}_{change}$ (1, 47) = 28.18, $\underline{p} < .001$, with perceived behavioral control ($\beta = .73$, $\underline{p} < .001$) emerging as the only significant determinant of intention B.

In the third regression model, attitude and subjective norm (Block 1) explained 12.8% of the variance in intention C (dependent variable), $\underline{F}$ (2, 48) = 3.53, $\underline{p} = .04$. Perceived behavioral control (Block 2) explained an additional 45.5% of the variance in intention C, $\underline{F}$ change (1, 47) = 51.42, $\underline{p} < .001$, with perceived behavioral control ($\beta = .84$, $\underline{p} < .001$) emerging as the only significant predictor of intention C (see Table 3-9).

Predicting exercise behavior. Neither intention (A, B, and C) nor perceived behavioral control was a significant determinant of behavior (one and two) in any of the six remaining regression models (see Table 3-9).

Predicting diet intention. In the first regression model, attitude and subjective norm (Block 1) explained 37.5% of the variance in intention A (dependent variable), $\underline{F}$ (2, 45) = 13.52, $\underline{p} < .001$. Perceived behavioral control (Block 2) explained an additional 5.2% of the variance in intention A, $\underline{F}_{change}$ (1, 44) = 3.96, $\underline{p} = .05$, with subjective norm

Table 3-9

Hierarchical Regression Analyses for the Exercise Theory of Planned Behavior Constructs for Sample One

Variable	R^2	F	F_{change}	p	Beta
Predicting Intention A					
Block 1	.155	4.50		.016	
1. Attitude				.049	.283
2. Subjective norm				.172	.194
Block 2	.519	17.30	36.37	.000	
1. Attitude				.480	-.087
2. Subjective norm				.566	.063
3. Perceived behavioral control				.000	.743
Predicting Intention B					
Block 1	.077	2.01		.145	
1. Attitude				.126	.230
2. Subjective norm				.516	.097
Block 2	.423	11.50	28.18	.000	
1. Attitude				.313	-.140
2. Subjective norm				.794	-.032
3. Perceived behavioral control				.000	.729
Predicting Intention C					
Block 1	.128	3.53		.037	
1. Attitude				.061	.276
2. Subjective norm				.294	.152
Block 2	.584	21.97	51.42	.000	
1. Attitude				.210	-.148
2. Subjective norm				.960	.005
3. Perceived behavioral control				.000	.836
Predicting Behavior 1					
Block 1	.049	2.66		.109	
1. Intention A				.109	.220
Block 2	.059	1.61	0.58	.210	
1. Intention A				.560	.114
2. Perceived behavioral control				.449	.148

Table 3-9. Continued

Variable	R^2	F	F_{change}	p	Beta
Predicting Behavior 1					
Block 1	.044	2.37		.130	
1. Intention B				.130	.211
Block 2	.057	1.50	0.64	.233	
1. Intention B				.509	.119
2. Perceived behavioral control				.426	.143
Predicting Behavior 1					
Block 1	.060	3.28		.076	
1. Intention C				.076	.246
Block 2	.063	1.69	0.15	.195	
1. Intention C				.375	.185
2. Perceived behavioral control				.699	.081
Predicting Behavior 2					
Block 1	.039	2.13		.150	
1. Intention A				.150	.199
Block 2	.059	1.60	1.07	.211	
1. Intention A				.781	.054
2. Perceived behavioral control				.306	.201
Predicting Behavior 2					
Block 1	.053	2.84		.098	
1. Intention B				.098	.230
Block 2	.064	1.72	0.63	.189	
1. Intention B				.438	.139
2. Perceived behavioral control				.431	.141
Predicting Behavior 2					
Block 1	.054	2.88		.096	
1. Intention C				.096	.231
Block 2	.061	1.62	0.39	.208	
1. Intention C				.522	.134
2. Perceived behavioral control				.534	.130

Note. Intention A was the average of the three 7-point scales. Intention B was the continuous-open item. Intention C was the average of all four intention measures after conversion to z scores. Behavior 1 was the continuous-closed (numerical) item. Behavior 2 was the continuous-open item.

($\beta = .30$, $p = .04$) maintaining its unique contribution and emerging as the only significant predictor of intention A.

In the second regression model, attitude and subjective norm (Block 1) explained 21.1% of the variance in intention B (dependent variable), F (2, 46) = 6.15. $p = .004$). Perceived behavioral control (Block 2) did not explain an additional amount of the variance in intention B, F_{change} (1, 45) = 0.01, $p = .92$. Attitude, subjective norm, and perceived behavioral control were not significant predictors of intention B.

In the third regression model, attitude and subjective norm (Block 1) explained 35.2% of the variance in intention C (dependent variable), F (2, 45) = 12.22, $p < .001$. Perceived behavioral control (Block 2) explained an additional 1.6% of the variance in intention C, F_{change} (1, 44) = 1.10, $p = .30$, with subjective norm ($\beta = .32$, $p = .04$) emerging as the only significant determinant of intention C (see Table 3-10).

Predicting diet behavior. Neither intention (A, B, and C) nor perceived behavioral control was a significant determinant of behavior (one and two) in any of the six remaining regression models (see Table 3-10).

Sample Two

Participants versus individuals who withdrew from the program. An independent samples t-test was conducted to determine if any significant differences existed between the final sample of participants and the individuals who withdrew from the program after attending the program orientation ($n = 13$) on demographic characteristics, current exercise behavior, the TPB constructs, and beliefs. A significant group difference emerged for exercise perceived behavioral control, t (68) = -2.06, $p = .04$. A comparison of the means revealed that exercise perceived behavioral control was significantly lower

Table 3-10
Hierarchical Regression Analyses for the Diet Theory of Planned Behavior Constructs for Sample One

Variable	R^2	F	F_{change}	p	Beta
Predicting Intention A					
Block 1	.375	13.52		.000	
1. Attitude				.034	.309
2. Subjective norm				.009	.385
Block 2	.427	10.93	3.96	.000	
1. Attitude				.166	.206
2. Subjective norm				.040	.303
3. Perceived behavioral control				.053	.279
Predicting Intention B					
Block 1	.211	6.15		.004	
1. Attitude				.097	.268
2. Subjective norm				.118	.252
Block 2	.211	4.02	0.10	.013	
1. Attitude				.146	.261
2. Subjective norm				.138	.248
3. Perceived behavioral control				.923	.016
Predicting Intention C					
Block 1	.352	12.22		.000	
1. Attitude				.037	.311
2. Subjective norm				.016	.362
Block 2	.368	8.53	1.10	.000	
1. Attitude				.106	.254
2. Subjective norm				.041	.317
3. Perceived behavioral control				.300	.154
Predicting Behavior 1					
Block 1	.001	0.04		.848	
1. Intention A				.848	.027
Block 2	.027	0.68	1.32	.512	
1. Intention A				.452	.126
2. Perceived behavioral control				.256	-.191

Table 3-10. Continued

Variable	R^2	F	F_{change}	p	Beta
Predicting Behavior 1					
Block 1	.002	0.13		.723	
1. Intention B				.723	-.050
Block 2	.004	0.11	0.10	.894	
1. Intention B				.800	-.037
2. Perceived behavioral control				.753	-.046
Predicting Behavior 1					
Block 1	.000	0.00		.960	
1. Intention C				.960	-.007
Block 2	.019	0.46	0.91	.636	
1. Intention C				.711	.059
2. Perceived behavioral control				.345	-.152
Predicting Behavior 2					
Block 1	.002	0.11		.747	
1. Intention A				.747	.046
Block 2	.036	0.90	1.69	.415	
1. Intention A				.347	.157
2. Perceived behavioral control				.200	-.215
Predicting Behavior 2					
Block 1	.001	0.06		.812	
1. Intention B				.812	-.034
Block 2	.003	0.09	0.12	.917	
1. Intention B				.891	-.020
2. Perceived behavioral control				.734	-.050
Predicting Behavior 2					
Block 1	.000	0.00		.948	
1. Intention C				.948	.009
Block 2	.024	0.58	1.16	.563	
1. Intention C				.598	.084
2. Perceived behavioral control				.288	-.171

Note. Intention A was the average of the three 7-point scales. Intention B was the continuous-open item. Intention C was the average of all four intention measures after conversion to z scores. Behavior 1 was the continuous-closed (numerical) item. Behavior 2 was the continuous-open item.

for the participants that withdrew from the program (M = 5.41, SD = 1.04) than for the participants in the final sample (M = 6.11, SD = 1.11). No other results were significant.

Descriptive statistics for exercise behavior. Descriptive statistics for previous exercise behavior indicated that six months before the weight-loss intervention the participants reported 0.00 to 21.00 METs (M = 6.27, SD = 6.94) of mild exercise, 0.00 to 42.00 METs (M = 13.20, SD = 13.39) of moderate exercise, and 0.00 to 63.00 METs (M = 18.00, SD = 19.00) of strenuous exercise per week. Participants also reported 0.00 to 21.00 METs (M = 8.14, SD = 7.31) of mild exercise, 0.00 to 35.00 METs (M = 11.70, SD = 10.49) of moderate exercise, and 0.00 to 63.00 METs (M = 17.07, SD = 16.58) of strenuous exercise per week just before beginning the weight-loss intervention (see Table 3-4).

Descriptive statistics for the TPB constructs and beliefs. On the 7-point scales, the participants reported a positive exercise (M = 6.25, SD = 0.49) and diet (M = 5.70, SD = 0.76) attitude, a positive exercise (M = 5.84, SD = 1.23) and diet (M = 5.75, SD = 1.32) subjective norm, a positive exercise (M = 6.11, SD = 1.11) and diet (M = 5.45, SD = 1.14) perceived behavioral control, and a positive exercise (M = 6.75, SD = 0.51) and diet (M = 6.57, SD = 0.55) intention. Participants also held positive exercise (M = 6.48, SD = 0.55) and diet (M = 6.25, SD = 0.73) behavioral beliefs, positive exercise (M = 6.43, SD = 0.73) and diet (M = 6.38, SD = 0.84) normative beliefs, and positive exercise (M = 5.07, SD = 1.09) and diet (M = 4.42, SD = 1.21) control beliefs (see Table 3-11).

Body composition and physical fitness measures. Results of the repeated measures ANOVAs revealed that the participants significantly reduced their BMI, Wilks'

Lambda = .54, F (2, 35) = 15.02, $p < .001$, $\eta^2 = .46$; percent body fat, Wilks' Lambda = .56, F (2, 32) = 12.53, $p < .001$, $\eta^2 = .44$; waist circumference, Wilks' Lambda = .81, F (2, 35) = 4.02, $p = .03$, $\eta^2 = .19$; and hip circumference, Wilks' Lambda = .74, F (2, 35) = 6.25, $p = .005$, $\eta^2 = .26$. The post-hoc analyses revealed that BMI, percent body fat, and hip circumference were significantly reduced from pre to postprogram and from preprogram to the 1-month follow-up. Finally, waist circumference was significantly reduced from preprogram to the 1-month follow-up. On average, participants lost 1.4% of their initial body weight by the end of the 4-week program.

Participants also significantly improved their cardiorespiratory fitness, Wilks' Lambda = .76, F (1, 36) = 11.25, $p = .002$, $\eta^2 = .24$, from pre to postprogram. No other fitness measures were significantly improved (see Table 3-12).

Exercise TPB constructs and beliefs associations. The attitude-behavioral beliefs ($r = .46$, $p < .001$), perceived behavioral control-control beliefs ($r = .49$, $p < .001$), and subjective norm-normative beliefs ($r = .55$, $p < .001$) associations were significant. Intention A was positively associated with attitude ($r = .50$, $p < .001$), perceived behavioral control ($r = .82$, $p < .001$), and control beliefs ($r = .36$, $p = .007$). Intention B was significantly related to attitude ($r = .47$, $p < .001$) and perceived behavioral control ($r = .76$, $p < .001$). Intention C was positively correlated with attitude ($r = .50$, $p < .001$), perceived behavioral control ($r = .83$, $p < .001$), and control beliefs ($r = .34$, $p = .01$). Finally, BMI was positively correlated with subjective norm ($r = .31$, $p = .02$; see Table 3-13).

Diet TPB constructs and beliefs associations. The attitude-behavioral beliefs ($r = .48$, $p < .001$), perceived behavioral control-control beliefs ($r = .59$, $p < .001$), and

Table 3-11

Mean (M), Standard Deviation (SD) Scores, and Reliabilities (α) of the Theory of Planned Behavior Constructs for Sample Two

Constructs	M	SD	α
Exercise			
Attitude	6.25	0.49	.74
Subjective norm	5.84	1.23	.79
Perceived behavioral control	6.11	1.11	.89
Intention A	6.75	0.51	.90
Intention B*	11.59	0.85	
Intention C	0.02	0.91	.93
Behavioral beliefs	6.48	0.55	.71
Control beliefs	5.07	1.09	.84
Normative Beliefs	6.43	0.73	.84
Diet			
Attitude	5.70	0.76	.80
Subjective norm	5.75	1.32	.83
Perceived Behavioral Control	5.45	1.14	.77
Intention A	6.57	0.55	.78
Intention B*	26.56	2.14	
Intention C	0.01	0.83	.85
Behavioral Beliefs	6.25	0.73	.63
Control Beliefs	4.42	1.21	.87
Normative Beliefs	6.38	0.84	.87

Note. *The intention B scale was a one-item scale. Intention A was the average of the three 7-point scales. Intention B was the continuous-open item. Intention C was the average of all four intention measures after conversion to z scores.

subjective norm-normative beliefs ($r = .65$, $p < .001$) associations were significant. Intention A was positively associated with attitude ($r = .44$, $p < .001$), behavioral beliefs ($r = .35$, $p = .007$), subjective norm ($r = .39$, $p = .002$), normative beliefs ($r = .42$, $p = .002$), perceived behavioral control ($r = .42$, $p = .001$), and control beliefs ($r = .29$, $p = .03$). Intention B was positively correlated with attitude ($r = .33$, $p = .01$), subjective norm ($r = .31$, $p = .02$), perceived behavioral control ($r = .38$, $p = .003$), and control beliefs ($r = .37$, $p = .004$). Intention C was significantly related to attitude ($r = .43$,

$p = .001$), behavioral beliefs ($r = .29$, $p = .02$), subjective norm ($r = .39$, $p = .002$), normative beliefs ($r = .39$, $p = .005$), perceived behavioral control ($r = .43$, $p = .001$), and control beliefs ($r = .34$, $p = .01$). The subjective norm-behavior one ($r = .32$, $p = .02$), subjective norm-behavior two ($r = .31$, $p = .02$), intention A-behavior one ($r = .28$, $p = .04$), intention A-behavior two ($r = .27$, $p = .04$), intention B-behavior one ($r = .31$, $p = .02$), intention B-behavior two ($r = .30$, $p = .02$), intention C-behavior one ($r = .31$, $p = .02$), and intention C-behavior two ($r = .30$, $p = .02$) associations were significant. Finally, BMI was significantly related to subjective norm ($r = .34$, $p = .009$) and normative beliefs ($r = .33$, $p = .02$; see Table 3-14).

Table 3-12
Mean (M) and Standard Deviation (SD) Scores for the Body Composition and Physical Fitness Measurements from Pre to Postprogram and Postprogram to 1-Month Follow-Up for Sample Two

	Pre	Post	Follow-Up
Measurement	M (SD)	M (SD)	M (SD)
Body mass index	27.75_a (4.23)	27.29_b (4.18)	27.21_b (4.16)
Percent body fat	29.78_a (5.57)	27.27_b (4.61)	27.00_b (4.57)
Waist	34.24_a (3.73)	34.07 (4.00)	33.63_b (3.51)
Hip	41.48_a (3.52)	40.96_b (3.36)	40.91_b (3.43)
Resting heart rate	74.84 (11.03)	75.73 (13.01)	
Diastolic blood pressure	69.09 (7.73)	70.52 (8.50)	
Systolic blood pressure	105.31_a (12.14)	109.04_b (13.81)	
Recovery heart rate index	163.38_a (29.96)	151.68_b (33.61)	

Note. Means in the same row with different subscripts significantly differ at $p < .01$.

Table 3-13

Pearson Correlations Among the Exercise Theory of Planned Behavior Constructs, Beliefs, Behavior, Age, and Body Mass Index for Sample Two

	2	3	4	5	6	7	8	9	10	11	12	13
1. Attitude	.46**	.22	.32*	.53**	.39**	.50**	.47**	.50**	-.02	.01	.20	.08
2. Behavioral beliefs	-	.37**	.37**	.11	.20	.21	.17	.20	-.01	-.02	.21	.21
3. Subjective norm		-	.55**	.02	.01	.07	.07	.07	.14	.14	.06	.31*
4. Normative beliefs			-	.09	.23	.17	.15	.17	-.12	-.08	.05	.24
5. Perceived behavioral control				-	.49**	.82**	.76**	.83**	-.11	-.09	-.09	.18
6. Control beliefs					-	.36**	.26	.34*	-.08	-.04	-.02	.07
7. Intention A						-	.84**	.99**	.07	.08	-.01	.01
8. Intention B							-	.92**	.07	.06	.08	.12
9. Intention C								-	.07	.07	.02	.04
10. Behavior 1									-	.98**	.08	-.13
11. Behavior 2										-	.07	-.13
12. Age											-	-.07
13. Body mass index												-

Note. *p < .05. **p < .01. Intention A was the average of the three 7-point scales. Intention B was the continuous-open item. Intention C was the average of all four intention measures after conversion to z scores. Behavior 1 was the continuous-closed (numerical) item. Behavior 2 was the continuous-open item.

Table 3-14

Pearson Correlations Among the Diet Theory of Planned Behavior Constructs, Beliefs, Behavior, Age, and Body Mass Index for Sample Two

	2	3	4	5	6	7	8	9	10	11	12	13
1. Attitude	.48**	.42**	.44**	.62**	.51**	.44**	.33*	.43**	.14	.13	.10	.06
2. Behavioral beliefs	-	.29*	.44**	.19	.18	.35**	.11	.29*	.04	.05	.16	.07
3. Subjective norm		-	.65**	.09	.24	.39**	.31*	.39**	.32*	.31*	-.08	.34**
4. Normative beliefs			-	.22	.25	.42**	.25	.39**	.05	.04	-.14	.33*
5. Perceived behavioral control				-	.59**	.42**	.38**	.43**	.05	.05	-.01	-.04
6. Control beliefs					-	.29*	.37**	.34*	.17	.15	-.05	.09
7. Intention A						-	.74**	.97**	.28*	.27*	.14	.03
8. Intention B							-	.87**	.31*	.30*	.10	-.03
9. Intention C								-	.31*	.30*	.14	-.00
10. Behavior 1									-	.99**	-.07	-.24
11. Behavior 2										-	-.04	-.25
12. Age											-	-.07
13. Body mass index												-

Note. *p < .05. **p < .01. Intention A was the average of the three 7-point scales. Intention B was the continuous-open item. Intention C was the average of all four intention measures after conversion to z scores. Behavior 1 was the continuous-closed (numerical) item. Behavior 2 was the continuous-open item.

Predicting exercise intention. In the first regression model, attitude and subjective norm (Block 1) explained 24.5% of the variance in intention A (dependent variable), F (2, 53) = 8.61, $p = .001$. Perceived behavioral control (Block 2) explained an additional 43.2% of the variance in intention A, F_{change} (1, 52) = 69.71, $p < .001$, with perceived behavioral control ($\beta = .78$, $p < .001$) emerging as the only significant predictor of intention A.

In the second regression model, attitude and subjective norm (Block 1) explained 20.2% of the variance in intention B (dependent variable), F (2, 53) = 6.69, $p = .003$. Perceived behavioral control (Block 2) explained an additional 37.1% of the variance in intention B, F_{change} (1, 52) = 45.06, $p < .001$, with perceived behavioral control ($\beta = 0.73$, $p < .001$) emerging as the only significant determinant of intention B.

In the third regression model, attitude and subjective norm (Block 1) explained 24.2% of the variance in intention C (dependent variable), F (2, 53) = 8.44, $p = .001$. Perceived behavioral control (Block 2) explained an additional 44.2% of the variance in intention C, F_{change} (1, 52) = 72.60, $p < .001$, with perceived behavioral control ($\beta = .79$, $p < .001$) emerging as the only significant predictor of intention C (see Table 3-15).

Predicting exercise behavior. Neither intention (A, B, and C) nor perceived behavioral control was a significant determinant of behavior (one and two) in any of the six remaining regression models (see Table 3-15).

Predicting diet intention. In the first regression model, attitude and subjective norm (Block 1) explained 24.7% of the variance in intention A (dependent variable), F (2, 56) = 9.18, $p < .001$. Perceived behavioral control (Block 2) explained an additional 5.9% of the variance in intention A, F_{change} (1, 55) = 4.69, $p = .04$, with subjective norm

Table 3-15

Hierarchical Regression Analyses for the Exercise Theory of Planned Behavior Constructs for Sample Two

Variable	R^2	F	F_{change}	p	Beta
Predicting Intention A					
Block 1	.245	8.61		.001	
1. Attitude				.000	.505
2. Subjective norm				.614	-.062
Block 2	.677	36.41	69.71	.000	
1. Attitude				.480	.068
2. Subjective norm				.718	.030
3. Perceived behavioral control				.000	.784
Predicting Intention B					
Block 1	.202	6.69		.003	
1. Attitude				.001	.460
2. Subjective norm				.494	-.087
Block 2	.572	23.19	45.06	.000	
1. Attitude				.618	.055
2. Subjective norm				.986	-.002
3. Perceived behavioral control				.000	.726
Predicting Intention C					
Block 1	.242	8.44		.001	
1. Attitude				.000	.502
2. Subjective norm				.539	-.076
Block 2	.683	37.43	72.60	.000	
1. Attitude				.524	.061
2. Subjective norm				.835	.017
3. Perceived behavioral control				.000	.792
Predicting Behavior 1					
Block 1	.003	0.15		.697	
1. Intention A				.697	.053
Block 2	.070	2.02	3.88	.142	
1. Intention A				.071	.417
2. Perceived behavioral control				.054	-.447

Table 3-15. Continued

Variable	R^2	F	F_{change}	p	Beta
Predicting Behavior 1					
Block 1	.002	0.10		.756	
1. Intention B				.756	.042
Block 2	.047	1.33	2.55	.274	
1. Intention B				.162	.288
2. Perceived behavioral control				.116	-.325
Predicting Behavior 1					
Block 1	.002	0.13		.716	
1. Intention C				.716	.049
Block 2	.071	2.06	3.99	.137	
1. Intention C				.068	.434
2. Perceived behavioral control				.051	-.465
Predicting Behavior 2					
Block 1	.003	0.18		.676	
1. Intention A				.676	.057
Block 2	.060	1.72	3.25	.189	
1. Intention A				.092	.392
2. Perceived behavioral control				.077	-.411
Predicting Behavior 2					
Block 1	.001	0.04		.841	
1. Intention B				.841	.027
Block 2	.030	0.84	1.64	.437	
1. Intention B				.275	.226
2. Perceived behavioral control				.206	-.263
Predicting Behavior 2					
Block 1	.002	0.12		.728	
1. Intention C				.728	.047
Block 2	.056	1.60	3.07	.212	
1. Intention C				.105	.387
2. Perceived behavioral control				.086	-.411

Note. Intention A was the average of the three 7-point scales. Intention B was the continuous-open item. Intention C was the average of all four intention measures after conversion to z scores. Behavior 1 was the continuous-closed (numerical) item. Behavior 2 was the continuous-open item.

($\beta = .32$, $p = .02$) and perceived behavioral control ($\beta = .32$, $p = .04$) emerging as significant determinants of intention A.

In the second regression model, attitude and subjective norm (Block 1) explained 14.1% of the variance in intention B (dependent variable), $F\ (2, 56) = 4.59$. $p = .02$). Perceived behavioral control (Block 2) explained an additional 7.8% of the variance in intention B, $F_{\text{change}}\ (1, 55) = 5.52$, $p = .02$, with subjective norm ($\beta = .28$, $p = .04$) and perceived behavioral control ($\beta = .36$, $p = .02$) emerging as significant predictors of intention B.

In the third regression model, attitude and subjective norm (Block 1) explained 23.8% of the variance in intention C (dependent variable), $F\ (2, 56) = 8.75$, $p < .001$. Perceived behavioral control (Block 2) explained an additional 7.4% of the variance in intention C, $F_{\text{change}}\ (1, 55) = 5.92$, $p = .02$, with subjective norm ($\beta = .33$, $p = .01$) and perceived behavioral control ($\beta = .35$, $p = .02$) emerging as significant determinants of intention C (see Table 3-16).

Predicting diet behavior. In the fourth regression model, intention A (Block 1) explained 7.6% of the variance in behavior one (dependent variable), $F\ (1, 57) = 4.68$, $p = .04$. Perceived behavioral control (Block 2) did not explain an additional amount of variance in behavior one, $F_{\text{change}}\ (1, 56) = 0.35$, $p = .56$, therefore intention A ($\beta = .28$, $p = .04$) was the only significant determinant of behavior one.

In the fifth regression model, intention B (Block 1) explained 9.7% of the variance in behavior one (dependent variable), $F\ (1, 57) = 6.11$, $p = .02$. Perceived behavioral control (Block 2) did not explain an additional amount of the variance in behavior one, $F_{\text{change}}(1, 56) = 0.39$, $p = .54$, making intention B the only significant determinant of behavior 1 ($\beta = .31$, $p < .02$).

In the sixth regression model, intention C (Block 1) explained 9.3% of the variance in behavior one (dependent variable), $F(1, 57) = 5.88$, $p = .02$. Perceived behavioral control (Block 2) did not explain an additional amount of the variance in behavior one, $F_{\text{change}}(1, 56) = 0.57$, $p = .45$. Thus, intention C ($\beta = .31$, $p < .02$) was the only significant predictor of behavior one.

In the seventh regression model, intention A (Block 1) explained 7.3% of the variance in behavior two (dependent variable), $F(1, 57) = 4.50$, $p = .04$. Perceived behavioral control (Block 2) did not explain an additional amount of variance in behavior two, $F_{\text{change}}(1, 56) = 0.27$, $p = .61$. Intention A ($\beta = .27$, $p = .04$) was the only significant determinant of behavior two.

In the eighth regression model, intention B (Block 1) explained 9.2% of the variance in behavior two (dependent variable), $F(1, 57) = 5.79$, $p = .02$. Perceived behavioral control did not explain an additional amount of variance in behavior two, $F_{\text{change}}(1, 56) = 0.29$, $p = .59$, therefore intention B ($\beta = .30$, $p = .02$) was the only significant predictor of behavior two.

Finally, in the ninth regression model, intention C (Block 1) explained 8.9% of the variance in behavior two (dependent variable), $F(1, 57) = 5.60$, $p = .02$. Perceived behavioral control did not explain an additional amount of variance in behavior two, $F_{\text{change}}(1, 56) = 0.45$, $p = .51$, thus intention C ($\beta = .30$, $p = .02$) was the only significant determinant of behavior two (see Table 3-16).

Table 3-16
Hierarchical Regression Analyses for the Diet Theory of Planned Behavior Constructs for Sample Two

Variable	R^2	F	F_{change}	p	Beta
Predicting Intention A					
Block 1	.247	9.18		.000	
1. Attitude				.011	.335
2. Subjective norm				.052	.253
Block 2	.306	8.09	4.69	.000	
1. Attitude				.480	.114
2. Subjective norm				.016	.316
3. Perceived behavioral control				.035	.317
Predicting Intention B					
Block 1	.141	4.59		.014	
1. Attitude				.085	.239
2. Subjective norm				.135	.207
Block 2	.219	5.14	5.52	.003	
1. Attitude				.928	-.015
2. Subjective norm				.043	.279
3. Perceived behavioral control				.022	.364
Predicting Intention C					
Block 1	.238	8.75		.000	
1. Attitude				.015	.322
2. Subjective norm				.050	.257
Block 2	.312	8.32	5.92	.000	
1. Attitude				.641	.075
2. Subjective norm				.012	.326
3. Perceived behavioral control				.018	.354
Predicting Behavior 1					
Block 1	.076	4.68		.035	
1. Intention A				.035	.275
Block 2	.082	2.49	0.35	.092	
1. Intention A				.032	.310
2. Perceived behavioral control				.555	-.084

Table 3-16. Continued

Variable	R^2	F	F_{change}	p	Beta
Predicting Behavior 1					
Block 1	.097	6.11		.016	
1. Intention B				.016	.311
Block 2	.103	3.21	0.39	.048	
1. Intention B				.015	.344
2. Perceived behavioral control				.536	-.085
Predicting Behavior 1					
Block 1	.093	5.88		.019	
1. Intention C				.019	.306
Block 2	.103	3.20	0.57	.048	
1. Intention C				.015	.351
2. Perceived behavioral control				.454	-.106
Predicting Behavior 2					
Block 1	.073	4.50		.038	
1. Intention A				.038	.271
Block 2	.078	2.36	0.27	.104	
1. Intention A				.037	.301
2. Perceived behavioral control				.607	-.073
Predicting Behavior 2					
Block 1	.092	5.79		.019	
1. Intention B				.019	.304
Block 2	.097	3.00	0.29	.058	
1. Intention B				.019	.332
2. Perceived behavioral control				.592	-.074
Predicting Behavior 2					
Block 1	.089	5.60		.021	
1. Intention C				.021	.299
Block 2	.097	2.99	0.45	.058	
1. Intention C				.019	.339
2. Perceived behavioral control				.507	-.094

Note. Intention A was the average of the three 7-point scales. Intention B was the continuous-open item. Intention C was the average of all four intention measures after conversion to z scores. Behavior 1 was the continuous-closed (numerical) item. Behavior 2 was the continuous-open item.

Discussion

The three purposes of this study were to (a) prospectively examine the utility of the TPB for predicting exercise and diet behavior with overweight women; (b) examine the relationships between the TPB constructs and their underlying beliefs; and (c) determine the efficacy of the weight-loss intervention for improving participant's weight, body composition, and physical fitness. In general, the results of this study provide partial support for the TPB as a useful framework for predicting overweight women's exercise and diet intention and behavior. Four findings of this study are highlighted in this section.

First, partial support was found for the hypothesis regarding the prediction of exercise and diet behavior. It was hypothesized that intention and perceived behavioral control would predict behavior, and that intention would be the strongest determinant. However, intention and perceived behavioral control failed to predict exercise behavior in both samples. This finding is contrary to previous research with the TPB and exercise (Godin & Kok, 1996; Hausenblas et al., 1997); however, it is similar to the results of a study of overweight women participating in a 4-week weight-loss program (Ellis Gardner & Hausenblas, in press).

The nonsignificant findings may be explained by how exercise behavior was measured. That is, in both studies attendance of exercise classes was used as an objective measure of exercise behavior (Sallis & Saelens, 2000). Armitage and Conner (2001) found that intention and perceived behavioral control explained a greater proportion of variance in prospective studies that used self-reported data versus objective measures of behavior. For example, Armitage and Conner (1999c) used the TPB to examine a sample of hospital workers' consumption of a low-fat diet. The authors reported that the TPB accounted for three times the amount of variance in self-reported versus actual behavior, and they concluded that the TPB may be a poor predictor of actual behavior.

Finally, perceived behavioral control's failure to predict behavior may be due to the participant's lack of familiarity with the behaviors within the format of the weight-loss program. In a meta-analytic review of 63 tests of perceived behavioral control in the prediction of intention and behavior, Notani (1998) concluded that individuals are unable to accurately estimate their perceptions of control over unfamiliar behaviors. Lack of familiarity is a moderator in the perceived behavioral control-intention relationship and it causes perceived behavioral control to be a poor predictor of intention, and thus, behavior. Although the participants in this study may have been familiar with exercise and diet behaviors, they were all first time participants of the program. Participants may not have been certain how much control they were going to have within the context of the 4-week program.

Partial support of the hypothesis was achieved for predicting diet behavior. Intention was the only determinant of diet behavior in sample two, and this finding is consistent with previous research (Armitage & Conner, 1999a, 1999b, 1999c; Armitage, Conner, & Norman, 1999; Bagozzi & Kimmel, 1995; Ellis Gardner & Hausenblas, in press; Povey, Conner, Sparks, James, & Shepherd, 2000a). This finding indicates that motivation to adhere to the diet is the best predictor of diet behavior for overweight students and not their perceptions of control over the behavior. Therefore, researchers need to closely examine students' intentions when trying to increase diet adherence during a weight-loss program. One possible method for increasing intention is to use implementation intentions (i.e., specifying when and where the behavior will be performed). Results of research studies provide evidence that the formation of an implementation intention increases the likelihood that a goal will be achieved (Gollwitzer, 1993; Gollwitzer & Brandstatter, 1997; Orbell, Hodgkins, & Sheeran, 1997; Orbell & Sheeran, 2000). Researchers conducting interventions with overweight students are encouraged to explore techniques such as implementation intentions in an effort to increase diet intention and diet adherence.

Second, partial support was also found for predicting exercise and diet intention. Attitude, subjective norm, and perceived behavioral control were expected to be significant determinants of intention, with attitude and perceived behavioral control emerging as the strongest predictors. For exercise intention, perceived behavioral control emerged as the only significant determinant in both samples of overweight women. Perceived behavioral control is an important predictor of exercise intention beyond attitude and subjective norm (Ajzen, 1991; Armitage & Conner, 2001; Blue, 1995; Culos-Reed, Gyurcsik, & Brawley, 2001; Ellis Gardner & Hausenbals, 2001; Godin, 1993, 1994; Godin & Kok, 1996). Perceived behavioral control has also been found to be the only significant determinant of exercise intention in several studies (Brenes, Strube, & Storandt, 1998; Blanchard, Courneya, Rodgers, & Murnaghan, 2002; Norman, Conner, & Bell, 2000). For example, Brenes and her colleagues prospectively examined attendance of an exercise class among older adults, and they found that perceived behavioral control was the only predictor of exercise intention. Similarly, using a cross-sectional design, Blanchard and colleagues reported that perceived behavioral control was the only significant determinant of exercise intention in a sample of prostate cancer survivors.

In addition to perceived behavioral control, subjective norm also emerged as an important determinant of diet intention for both samples of overweight women. Typically, subjective norm is an inconsistent predictor of intention in the exercise and diet literature (Ajzen, 1991; Blue, 1995; Carron, Hausenblas, & Estabrooks, 2003; Courneya & McAuley, 1995b; Culos-Reed et al., 2001; Ellis Gardner & Hausenblas, 2001; Godin & Kok, 1996; Hausenblas et al., 1997; Symons Downs & Hausenblas, 2002a). Despite the inconsistency that is reported in narrative and statistical reviews, subjective norm has been a significant determinant in several studies examining diet behavior (Armitage & Conner, 1999a, 1999b; Lloyd, Paisley, & Mela, 1993; Povey et al., 2000a; Sparks & Shepherd, 1992). For instance, Povey and colleagues prospectively examined intentions to eat five portions of fruits and vegetables per day with a sample of the general population (including children, adolescents, and adults). Subjective norm, in addition to the other TPB constructs, was a significant predictor of intention. Sparks and Shepherd also reported an independent effect for subjective norm in the prediction of intention to consume organically produced vegetables the following week with members of the general public.

Moreover, the finding that attitude did not predict exercise or diet intention is in contrast to previous research (Hausenblas et al., 1997; Ellis Gardner & Hauseblas, 2001; Symons Downs & Hausenblas, 2002a). This suggests that either a positive or negative evaluation of exercise and diet behavior among overweight women has less of an impact on their intention to perform these behaviors and the actual performance of these behaviors, than their perceptions of control and the perceived pressure from significant others. One possible explanation for this finding may be due to sample characteristics

(Estabrooks & Carron, 1998; Godin, Valois, Jobin, & Ross, 1991). During the six months before the weight-loss program, most of the participants in each sample reported at least one previous weight loss attempt (62.5% sample one, 79.7% sample two), and most of the participants also indicated successful weight-loss (58.9% sample one, 71.2% sample two). Therefore, it is not surprising that participants' attitudes were highly positive toward exercise (6.15 out of 7 for sample one, 6.25 out of 7 for sample two) and diet behavior (5.76 out of 7 for sample one, 5.70 for sample two; see Tables 3-5 and 3-11). In addition, the variability for exercise and diet attitude was small for both samples, thus limiting attitude's prediction of intention.

Thus, overweight women's perceptions of either the ease or difficulty of exercising (i.e., perceived behavioral control) may more strongly influence their exercise intention than how they evaluate exercise (i.e., attitude). For instance, although overweight women may evaluate exercise positively and perceive pressure from important people in their lives to exercise, factors that may make it difficult for them to exercise (e.g., sticking to a prearranged workout time, lack of support, physical ailments, fatigue or tiredness, etc.) will have a stronger impact on their intention to exercise. Furthermore, overweight women's perceptions of pressure from significant others, in addition to perceptions of control, may exert more influence than attitude on their diet intention. Again, overweight women may evaluate diet behavior positively and perceive many advantages of following a diet (e.g., improving eating habits, improving physical appearance, improving psychological well-being), but obstructing factors such as the inconvenience of following a diet, physical ailments, and temptations to eat unhealthy foods may derail their diet intention. Likewise, not feeling pressure (or support) from program trainers and friends may also negatively influence diet intention among overweight women. Therefore, understanding the determinants of exercise and diet behavior for overweight women can assist researchers in the development and implementation of interventions targeting these two behaviors.

Third, as predicted, positive associations were found between behavioral beliefs and attitude, control beliefs and perceived behavioral control, and normative beliefs and subjective norm for exercise and diet in both samples. These results are consistent with the theoretical tenets of the TPB (Ajzen, 1991), and they illustrate that the survey instrument used in this study did achieve content validity for the respective samples. This finding supports the conclusions of the elicitation study (Chapter 2), and highlights the importance of conducting elicitation studies with different samples before initiating the main TPB study.

Finally, partial support was provided for the efficacy of the weight-loss intervention for improving weight, body composition, and physical fitness. As expected, BMI, percent body fat, and hip circumference significantly decreased from pre to postprogram in both samples, however, waist circumference did not. Cardiorespiratory fitness for sample two significantly improved from pre to postprogram, whereas resting heart rate and blood pressure were not improved for either sample. In contrast to the hypothesis, BMI and percent body fat significantly decreased from postprogram to the 1-month follow-up, but only for sample one. Finally, all of the body composition measures (i.e., BMI, percent body fat, and waist and hip circumference) were significantly reduced from preprogram to the 1-month follow-up in both samples of overweight women. The body composition results are consistent with previous research with a similar sample (Ellis Gardner & Hausenblas, in press) and with the findings from the elicitation study (Chapter 2). Thus, the weight-loss intervention was successful for changing participants' weight and body composition, but not for improving physical fitness.

Although support for some of the hypotheses was obtained, limitations of this research should be considered when interpreting the results. First, the participants were self-selected into the weight-loss program. Although the program was free of charge, participants were possibly more motivated (i.e., stronger intentions), had stronger perceptions of control, possessed more favorable attitudes, and felt stronger subjective norm than a randomly selected sample. As previously mentioned, this could have influenced the predictive ability of the TPB constructs for exercise and diet intention, as well as exercise behavior. Brenes and colleagues (1998) warned that researchers should be careful when using participants enrolled in exercise classes because intention may not be a significant mediator in a model with a highly motivated sample.

A second limitation is the homogeneity of sample one. Most of the YMCA participants were middle-to-upper class, well-educated, Caucasian women, thus limiting the generalizability of these findings to overweight adult women who are less affluent, less educated, and racially or ethnically diverse. The location of the YMCA in town dictated the demographics of the sample, and therefore, future research should focus on examining the determinants of exercise and diet behavior in the aforementioned groups. This research is warranted given that racial and ethnic minorities, the less educated, and the less affluent are more likely to be overweight and inactive than Caucasians, the more educated, and the more affluent (USDHHS, 2000).

As discussed in the elicitation study (Chapter 2), another limitation of the research is the length of the weight-loss program. Although results indicated significant changes in weight and body composition from pre to postprogram for both samples, a minimum loss of 10% of initial body weight is necessary to promote changes in disease risk (Jeffery et al., 2000). Therefore, the duration of the intervention should be extended beyond 4 weeks, so participants can achieve some of the health-related benefits associated with weight loss.

The prediction of diet behavior was one of the major purposes of the study and unlike exercise behavior; an objective measure was not used. Although self-reported data compromises the accuracy of measurement, it appears that the TPB explains more variance in self-reported versus actual behavior (Armitage & Conner, 2001). This finding garnered more support, as exercise behavior in this study was not explained by either intention or perceived behavioral control, but overweight students' diet behavior was predicted by intention. Finally, social desirability was not controlled, despite relying almost exclusively on self-reported data. Although self-report measures increase the likelihood of socially desirable responses (Sallis & Owen, 1998), evidence does suggest that social desirability has no moderating effect on the relationships between the TPB constructs (Armitage & Conner, 1999b). Thus, social desirability may not be a limitation when using the TPB framework to predict intention and behavior.

In conclusion, the results of this study provide partial support for the use of the TPB to study exercise and diet intention and behavior with overweight women. Understanding overweight women's beliefs, attitudes, perceptions of control, and subjective norm towards these behaviors can assist researchers in the development and implementation of weight-loss interventions for these populations. However, it remains unclear if the TPB is an effective framework for promoting exercise and diet behavior change and therefore, further research with overweight and inactive populations is necessary to determine if the TPB is a viable framework for behavior change.

CHAPTER 4
GENERAL DISCUSSION

The general objective of this dissertation was to examine the utility of the theory of planned behavior (TPB; Ajzen, 1985, 1988, 1991) for predicting, explaining, and understanding overweight women's exercise and diet intention and behavior during a 4-week weight-loss program. Two studies were conducted to achieve this objective:

- Exercise and diet beliefs of overweight women: An elicitation study using the theory of planned behavior (Study 1, Chapter 2).
- Exercise and diet determinants during a weight-loss program: A prospective examination (Study 2, Chapter 3).

Therefore, the purposes of the final chapter are to (a) summarize the main findings of both studies, (b) discuss the strengths of the research, (c) identify limitations of the studies, (d) discuss areas for future research, and (e) draw general conclusions regarding the implications of this research.

Summary of the Dissertation Studies

Study 1: Elicitation Study

The main purpose of Study 1 (Chapter 2) was to examine the frequency of overweight women's behavioral, normative, and control exercise and diet beliefs during a weight-loss program following the guidelines established by Ajzen and Fishbein (1980). Beliefs were elicited from two samples of women. Sample one included 23 overweight and obese women who were members of a local YMCA ($\underline{M} = 44.55$, $\underline{SD} = 8.11$). Most of the participants in sample one were Caucasian, married, middle-to-upper class, and college educated. Sample two included 33 overweight and obese female university students (M age = 21.70, SD = 4.04) who were mostly Caucasian, single or never married, undergraduate students, and were employed part-time. The most salient exercise beliefs for both samples were

- Behavioral beliefs (advantages):
    - Improves physical appearance.
    - Improves psychological well-being.
    - Creates a healthier lifestyle.
    - Improves fitness level.
    - Increases motivation.
    - Increases energy.

- Control beliefs (obstructing factors):
    - Family responsibilities.
    - Lack of time.
    - Travel.
    - Job or school responsibilities.
    - Lack of variety.
    - Fatigue or tiredness.
    - Physical ailments.
    - The prearranged time of the workout.
    - Lack of support.
    - Lack of motivation.

- Normative beliefs:
    - Program trainers.
    - Group members.
    - Family.
    - Friends.
    - Spouse or significant other.

The most salient diet beliefs for both samples were

- Behavioral beliefs (advantages):
    - Improves eating habits.
    - Improves physical appearance.
    - Improves psychological well-being.

- Control beliefs (obstructing factors):
    - Social situations.
    - Temptations.
    - Dissatisfaction with the food.

  - Job responsibilities.
  - Lack of variety.
  - Mood disturbances.
  - Lack of time.
  - Family responsibilities.
  - Physical ailments.
  - Inconvenience.
  - Lack of freedom.

- Normative beliefs:
  - Program trainers.
  - Family.
  - Group members.
  - Spouse or significant other.
  - Friends.

The results of the elicitation study aided in the development of a belief-based questionnaire that was used in Study 2 (Chapter 3).

Study 2: Prospective Study

The main purpose of this study was to prospectively examine the utility of the TPB for predicting exercise and diet intention and behavior of overweight women. The participants were 56 overweight and obese women from the YMCA (M = 43.70, SD = 7.90) and 59 overweight and obese university students (M = 21.58, SD = 3.68) who volunteered for a 4-week weight-loss program. The demographic information (i.e., population type, sex, M age or age range, race or ethnicity, and socioeconomic status) for each sample of women was similar to the participants in Study 1. Thus, there is correspondence between the elicitation samples and main study samples, and the salient exercise and diet beliefs elicited in Study 1 are representative of the participants in Study 2 (Ajzen, 1991; Symons Downs, 2002).

For exercise behavior, it was found that intention and perceived behavioral control explained between 3.0% and 7.1% of the variance in behavior across both samples, and that neither intention nor perceived behavioral control was a significant determinant of exercise behavior. For exercise intention, attitude, subjective norm, and perceived behavioral control accounted for 42.3% to 68.3% of the variance in intention, and perceived behavioral control emerged as the only significant determinant of exercise intention for both samples of overweight women.

For diet behavior, explained variance ranged from 0.3% to 10.3% across both samples of women. However, intention was the lone significant predictor of diet behavior, and it was only significant for the student sample. Finally, for diet intention, attitude, subjective norm, and perceived behavioral control accounted for 21.1% to 42.7% of the variance in intention. Subjective norm and perceived behavioral control emerged as the significant determinants of diet intention for both samples of women.

Strengths of the Dissertation Studies

Four main limitations of the TPB research examining exercise and diet behavior were identified in the introductory chapter. These limitations included (a) a lack of elicitation studies, (b) the operationalization and measurement of perceived behavioral control, (c) the operationalization and measurement of subjective norm, and (d) the lack of scale correspondence. The strengths of the dissertation studies are identified in relationship to these limitations.

One limitation is the lack of elicitation studies that are conducted according to the recommendations of Ajzen and Fishbein (1980). Symons Downs and Hausenblas (2002a) reported that less than 50% of the studies included in their meta-analytic review of the TPB and exercise behavior included elicitation studies. Furthermore, elicitation studies are linked to larger intention-behavior and perceived behavioral control-behavior associations (Symons Downs & Hausenblas). Therefore, a strength of the dissertation studies is that an elicitation study (Study 1, Chapter 2) was conducted with samples of overweight women who were representative of the participants in the prospective study. In addition, the elicitation study was conducted in accordance to the guidelines established by Ajzen and Fishbein to elicit the salient behavioral, normative, and control beliefs from this population.

A second limitation identified in the TPB literature is the operationalization of perceived behavioral control. Inconsistencies in the definition of perceived behavioral control have made comparisons of results between studies difficult. Thus, it is unclear if perceived behavioral control, as it was originally conceived, is a significant determinant of intention and behavior. Recently, Ajzen (2002b) proposed that the measurement of perceived behavioral control should include items that reflect self-efficacy (i.e., the ease or difficulty of performing the behavior) and controllability (i.e., the beliefs about the extent to which the performance of the behavior is up to the individual). Trafimow, Sheeran, Conner, and Finlay (2002) also suggested that perceived behavioral control consist of the following two distinct variables: perceived difficulty (i.e., perceived ease or difficulty of performing the behavior) and perceived control (i.e., perception of control over the behavior). It is important to note that items reflecting both perceived difficulty and perceived control were included in the measurement of perceived behavioral control in Study 2 (see Appendix L).

Controversy also surrounds the measurement of subjective norm. Traditionally, subjective norm has a weak and inconsistent relationship with intention (Carron, Hausenblas, & Estabrooks, 2003; Courneya & McAuley, 1995b; Culos-Reed, Gyruscik,

& Brawley, 2001; Hausenblas, Carron, & Mack, 1997; Symons Downs and Hausenblas, 2002a). However, one potential cause of subjective norm's weak predictive power is that many researchers only use one item to assess subjective norm (Armitage & Conner, 2001). In a meta-analytic review of 185 TPB studies, Armitage and Conner reported stronger subjective norm-intention correlations with multiple-item measures versus single-item measures of subjective norm. Thus, a three-item subjective norm scale was used in Study 2 (see Appendix K).

Finally, much of the research examining exercise and diet behavior lacks scale correspondence (Ellis Gardner & Hausenblas, 2001; Symons Downs & Hausenblas, 2002a). A lack of scale correspondence occurs when different magnitudes, frequencies, or response formats are used to measure intention and behavior (Courneya, 1994; Courneya & McAuley, 1993b, 1994). Courneya recommended that researchers use the continuous-open or continuous-closed (numerical) response formats to measure intention and behavior to achieve strong associations between the constructs. In response to this recommendation, exercise and diet intention and behavior were measured using both formats (i.e., continuous open and continuous-closed [numerical]) in Study 2.

Limitations of the Dissertation Studies

Although the dissertation studies improve upon limitations of previous research using the TPB framework, there are limitations of these studies that should be discussed. First, participants were self-selected into the weight-loss programs versus being randomly recruited. Thus, the samples of overweight women in the two studies may have been more motivated, held more favorable attitudes, possessed stronger subjective norm, and stronger perceptions of control over exercise and diet than randomly recruited samples.

A second limitation is that the results from the elicitation study and the prospective study cannot be generalized to other groups of overweight and obese women. Specifically, less educated, less affluent, and racially or ethnically diverse women were not well represented in the samples included in the dissertation, therefore, limiting generalizability to these groups of people.

A third limitation of the research is the almost exclusive reliance on self-reported data. Although self-report measures increase the likelihood of socially desirable responses (Sallis & Owen, 1998), there is evidence to suggest that the TPB explains more variance in self-reported versus actual behavior (Armitage & Conner, 2001), and that social desirability has no moderating effect on the relationships between the TPB constructs (Armitage & Conner, 1999b). Therefore, self-reporting may not jeopardize the results of the present studies.

Fourth, the duration of the weight-loss program was too short to produce weight loss results that decrease disease risk. A minimum loss of 10% of initial body weight is necessary to reduce the risk of heart disease in overweight and obese individuals (Jeffery et al., 2000). Participants in both the elicitation and prospective studies did experience significant changes in weight and body composition over a 4-week period, but on average those results fell short of the minimum requirement to lower disease risk. It is plausible that participants will have different exercise and diet beliefs following participation in a longer program. Furthermore, it is possible that the TPB will lose its predictive ability during a longer time interval between the assessment of intention and the measurement of behavior (Ajzen & Fishbein, 1980; Ajzen & Madden, 1986; Courneya & McAuley, 1993a).

Finally, it should be noted that the sample sizes for the prospective study (Chapter 3) are smaller than recommended to achieve medium effects at an alpha level of .05 and with a power of .80 (Green, 1991). However, Hausenblas and colleagues (1997) found large effects for the intention-attitude, intention-perceived behavioral control, intention-behavior, and behavior-perceived behavioral control associations, and a moderate effect for the intention-subjective norm relationship in a meta-analytic review of the TPB and exercise behavior. Symons Downs and Hausenblas (2002a) also conducted a meta-analysis on the TPB and exercise, but they found only a moderate effect for the behavior-perceived behavioral control relationship. Therefore, the sample sizes in the prospective study were adequate to detect the large effects common in the literature, but may offer an explanation for why the exercise behavior-perceived behavioral control association only approached significance in a couple of the regression models.

Recommendations for Future Research

In addition to the recommendations presented in the introductory chapter regarding future directions, researchers should also consider examining moderator variables of the TPB, as well as explore the ability of the TPB to promote behavior change.

First, there is evidence to suggest that past behavior may predict subsequent behavior (Bagozzi & Kimmel, 1995; Courneya and Friedenreich, 1997; Courneya, Friedenreich, Arthur, & Bobick, 1999; Courneya, Keats, & Turner, 2000; Godin, Valois, & Lepage, 1993; Hagger, Chatzisarantis, Biddle, & Orbell, 2001; Norman & Smith, 1995). For instance, Godin and colleagues examined the predictive ability of the TPB constructs and habit (i.e., past behavior) for exercise intention and behavior with a sample of individuals from the general population and a sample of pregnant women. The results from both studies indicated that habit was the strongest predictor of future behavior in comparison to intention and perceived behavioral control. Similarly, Courneya, Keats, and colleagues found that in the final prediction equation that included intention and perceived behavioral control, exercise prediagnosis was the only significant determinant of exercise behavior during hospitalization among cancer patients. These researchers concluded that the TPB may be incomplete for the study of exercise behavior among cancer patients, and that other determinants should be considered for inclusion. Although Ajzen (1991) stated that the TPB is open to the inclusion of additional variables, he stipulated that additional variables must explain a significant amount of variance in intention or behavior beyond the original TPB constructs. However, Ajzen believes that past behavior does not provide additional explanatory value of subsequent behavior, therefore future research should include the examination of the moderating influence of past behavior on exercise and diet intention and behavior.

Second, demographic and personality variables may moderate the relationship between the TPB constructs and diet and exercise behavior (Lien, Lytle, & Komro, 2002; Rhodes, Courneya, & Hayduk, 2002). In an examination of fruit and vegetable consumption among young adolescents, Lien and colleagues reported moderating effects of gender, but not socioeconomic status on the attitude-intention and intention-behavior associations. It was found that attitude was a stronger predictor of intention to consume fruits and vegetables for adolescent girls, whereas intention was a stronger determinant of fruit and vegetable consumption for adolescent boys.

Using Costa and McCrae's (1992) five-factor model of personality, Rhodes, Courneya, and colleagues reported several moderating effects between the TPB constructs and exercise behavior in a sample of undergraduate students. Specifically, neuroticism and extraversion moderated the subjective norm-intention relationship, conscientiousness moderated the attitude-intention association, and extraversion and conscientiousness moderated the intention-behavior relationship. For instance, the authors proposed that individuals higher in extraversion might satisfy their exercise intentions because they tend to seek opportunities to be active. Also, high conscientious individuals are self-disciplined, and they may be more likely to implement their exercise intentions. Further research is warranted to examine the moderating influences of demographic and personality variables on the TPB and exercise and diet behavior. Moreover, this research should be conducted with populations that are at risk of physical inactivity, overweight, and obesity, such as women, ethnic minorities, the less affluent, the less educated, and older persons (United States Department of Health and Human Services [USDHHS], 2000).

Finally, the last step in the research process is to intervene to promote behavior change. Therefore, researchers are encouraged to develop and implement interventions based on the TPB framework that are designed to increase exercise and healthy diet behaviors. Although it was beyond the scope of this dissertation to examine the utility of the TPB as a behavior change model, it is clear that the health of Americans warrants this exploration as physical inactivity, overweight, and obesity continue to rise (USDHHS). Recently, Ajzen (2002a) provided guidelines for using the TPB for behavioral interventions, thus providing researchers with the proper tools to begin this line of investigation. However, behavioral interventions should only be conducted after an elicitation study and prospective studies of the determinants of exercise and diet behavior with specific populations have been completed (Ajzen).

Conclusion

In conclusion, this dissertation examined the ability of the TPB for predicting, explaining, and understanding overweight women's exercise and diet intention and behavior during a 4-week weight-loss program. Results of the two dissertation studies suggest that the TPB may be a reliable framework for examining exercise and diet intention, and to a lesser extent, exercise and diet behavior. It is recommended that future researchers continue to examine the determinants of exercise and diet behavior with at-risk populations for inactivity, overweight, and obesity, and attempt to improve upon the limitations of previous research. Furthermore, additional research is warranted to examine the moderating influences of past behavior, demographic characteristics, and personality variables on the TPB and exercise and diet. This research will allow for a better understanding of the determinants of exercise and diet behavior among special populations, thus enabling researchers to design and implement interventions that will effectively promote behavior change.

APPENDIX A
PERSONAL HISTORY QUESTIONNAIRE (VERSION A)

1. Name ________________________________
2. Last 4 digits of Social Security Number ______
3. Phone Number _____________
4. Gym Membership Number _________________
5. Age _____
6. Height _____
7. Weight _____
8. Current Job/Occupation ___________________

9. **Race/Ethnic Background:** (circle one)
   African American/Black American Indian Asian Caucasian
   Hispanic/Latino Other ___________

10. **Marital Status:** (circle one)
    Single Married Divorced Widowed Common Law Engaged

11. **Highest Level of Education:** (circle one)
    Grade School High School College Trade Graduate
    Other ___________

12. **Family Income:** (circle one)

Less than $10,000	$10,000- $20,000	$20,000- $40,000	$40,000- $100,000	Greater than $100,000

13. Weight loss program currently enrolled in: New You I New You II New You III

14. Is this your first time participating in this weight loss program? Yes No

APPENDIX B
PERSONAL HISTORY QUESTIONNAIRE (VERSION B)

1. First Name ___________________
2. Phone Number ___________________
3. Email Address ___________________
4. Age ______
5. Your height ____*ft* ____ *in*
6. Your current weight ______ *lbs*
7. Ideal weight (the weight you would LIKE to be right now) _______ *lbs*
8. The weight you would like to be at the END of the 4-week program _______ *lbs*

9. **Marital Status:** (circle one)

Single/Never Married Engaged Married Common Law
Divorced/Separated Widow

10. **Highest Level of Education:** (circle one)

Some high school Completed high school Some university/college
Completed university/college Some graduate/professional school
Completed graduate/professional school

11. **Annual Family Income:** (circle one)

Less than $20,000 $20,000-39,000 $40,000-59,000 $60,000-79,000
More than $80,000

12. **Ethnic Background:** (circle one)

African American/Black American Indian Asian/Pacific Islander
Caucasian Hispanic/Latino Multiracial

Other (please indicate) _______

13. **Employment Status:** (circle one)

Unemployed Part-time Full-time Retired Homemaker

Other (please indicate)________

14. **Number of Children:** (circle one)
None 1-2 children 3-4 children 5-9 children 10 or more children

15. Indicate the **number of days you weigh yourself** during a typical week: (circle one)
None 1-2 days 3-4 days 5-6 days 7 days

16. Indicate the **number of weight loss attempts** you have tried over the previous 6 months: (circle one)
None 1-3 attempts 4-6 attempts 7-9 attempts 10 or more attempts

17. Indicate the **number of pounds** lost from your most recent weight loss attempt: (circle one)
Not applicable None 1-4 pounds 5-9 pounds 10 or more pounds

APPENDIX C
LEISURE-TIME EXERCISE QUESTIONNAIRE (LTEQ)

Instructions. This is a scale that measures your leisure-time exercise (i.e., exercise that was done during your free time). Considering a typical week, please indicate how often (on average) you have engaged in strenuous, moderate, and mild exercise for 15 minutes or longer during your free time CURRENTLY and 6 MONTHS PRIOR to enrolling in the exercise and diet program.

		Currently	**6 Months Ago**
Strenuous exercise: heart beats rapidly (e.g., running, jogging, basketball, football, soccer, hockey, squash, judo, roller skating, vigorous swimming, long distance bicycling, aerobic dance classes, heavy weight training)	*How many times per typical week do you perform strenuous exercise for 15 minutes or longer?*	_____	_____
Moderate exercise: not exhausting, light sweating (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, popular and folk dancing)	*How many times per typical week do you perform moderate exercise for 15 minutes or longer?*	_____	_____
Mild exercise: minimal effort, no sweating (e.g., easy walking, yoga, archery, fishing, bowling, lawn bowling, shuffleboard, horseshoes, golf using a cart)	*How many times per typical week do you perform mild exercise for 15 minutes or longer?*	_____	_____

APPENDIX D
ELICITATION QUESTIONNAIRE

Part A Instructions. The following questions relate to your **exercise behavior during your participation** in the weight loss program. List as many that apply to you in the space provided below.

1. List the main **advantages** of exercising during the weight loss program.

____

____

____

____

2. List the main **disadvantages** of exercising during the weight loss program.

____

____

____

____

3. List the main factors that **prevented** you from exercising during the weight loss program.

____

____

____

____

4. List the main factors that **helped** you to exercise during the weight loss program.

____

____

____

____

5. List the **individuals or groups** who were important to you when you thought about exercising during the weight loss program.

____

____

____

____

Part B Instructions. The following questions relate to your **eating behavior during your participation** in the weight loss program. List as many that apply to you in the space provided below.

1. List the main **advantages** of following the diet during the weight loss program.

____

____

____

____

2. List the main **disadvantages** of following the diet during the weight loss program.

____

____

____

____

3. List the main factors that **prevented** you from following the diet during the weight loss program.

____

____

____

____

4. List the main factors that **helped** you to follow the diet during the weight loss program.

____

____

____

____

5. List the **individuals or groups** who were most important to you when you thought about following the diet during the weight loss program.

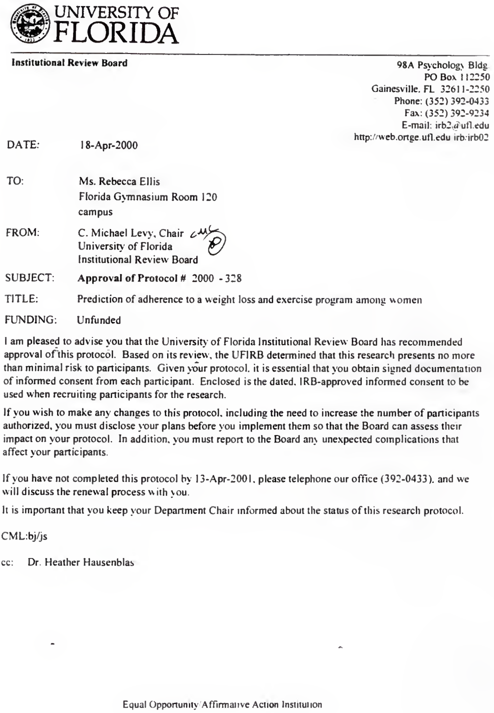
____

____

____

____

APPENDIX E
IRB APPROVAL FOR ELICITATION STUDY (SAMPLE 1)



UNIVERSITY OF
FLORIDA

Institutional Review Board

98A Psychology Bldg.
PO Box 112250
Gainesville, FL 32611-2250
Phone: (352) 392-0433
Fax: (352) 392-9234
E-mail: irb2@ufl.edu
http://web.ortge.ufl.edu/irb/irb02

DATE: 18-Apr-2000

TO: Ms. Rebecca Ellis
Florida Gymnasium Room 120
campus

FROM: C. Michael Levy, Chair
University of Florida
Institutional Review Board

SUBJECT: **Approval of Protocol #** 2000 - 328

TITLE: Prediction of adherence to a weight loss and exercise program among women

FUNDING: Unfunded

I am pleased to advise you that the University of Florida Institutional Review Board has recommended approval of this protocol. Based on its review, the UFIRB determined that this research presents no more than minimal risk to participants. Given your protocol, it is essential that you obtain signed documentation of informed consent from each participant. Enclosed is the dated, IRB-approved informed consent to be used when recruiting participants for the research.

If you wish to make any changes to this protocol, including the need to increase the number of participants authorized, you must disclose your plans before you implement them so that the Board can assess their impact on your protocol. In addition, you must report to the Board any unexpected complications that affect your participants.

If you have not completed this protocol by 13-Apr-2001, please telephone our office (392-0433), and we will discuss the renewal process with you.

It is important that you keep your Department Chair informed about the status of this research protocol.

CML:bj/js

cc: Dr. Heather Hausenblas

Equal Opportunity/Affirmative Action Institution

APPENDIX F
CONSENT FORM FOR ELICITATION STUDY (SAMPLE 1)

To: Volunteers for the Exercise and Eating Behaviors Study
From: Drs. Hausenblas, Shepperd, Tucker and Rebecca Ellis Gardner, MS
RE: Informed Consent

The purpose of this statement is to summarize the study we are conducting, explain what we are asking you to do, and to assure you that all participants in the study will be assigned a coded number; individuals will not be identified by name but by the assigned code number. All data will be treated in strict confidence to the extent of the law and will be locked in a filing cabinet in the exercise psychology laboratory located in Room 140 Florida Gymnasium.

We are all researchers at the University of Florida. Dr. Hausenblas is an assistant professor in Exercise Psychology, Dr. Shepperd is an associate professor of Psychology, Dr. Tucker is a professor of Psychology, and Rebecca Ellis Gardner is a Ph.D. student in Exercise Psychology and a trainer for the New You program at the Gainesville Health and Fitness Women's Center. We are interested in examining your exercise and eating behaviors. You will be asked to complete a series of questionnaires prior to the beginning of the program (time estimated to complete is approximately 30 minutes) and at the completion of the four-week program (time estimated to complete is approximately 15 minutes). A follow-up interview four weeks after you complete the program (8 weeks from the beginning of the program) will consist of similar questions (time estimated to complete is approximately 5 minutes). You will also have several physiological measures taken (i.e., weight, body fat composition, and circumference measurements). You are free to discontinue your involvement in the study at any time without consequence. If at any time you do not wish to continue with the study, you will be free to withdraw from participation. There are no risks involved in participating in the study. The benefits associated with the study are a better understanding of your exercise and eating behaviors.

It is hoped that you will agree to take part in the study. Without the cooperation of volunteers such as you, projects of this type would not be possible. Please ask any questions you may have at this time, and if you have any additional questions or concerns during the course of the study, please contact Dr. Hausenblas (392-0584 ext. 1292). Questions or concerns about research participants' rights may be directed to the UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250 (392-0433).

If you have no further questions at this time, and if you agree to volunteer to become involved in this study, please read the following statement and sign your name in the signature blank below.

I have read the procedure above and I voluntarily agree to participate in the procedure

Participant's signature:____
Date:________________________
Principal Investigator's signature:__________________________________

APPENDIX G
IRB APPROVAL FOR ELICITATION STUDY (SAMPLE 2) AND PROSPECTIVE STUDY

UNIVERSITY OF
FLORIDA

Institutional Review Board

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Fax: (352) 392-9234
E-mail: irb2@ufl.edu
http://www.rgp.ufl.edu/irb/irb02

DATE: 15-Feb-2002

TO: Ms. Rebecca Gardner
FL GYM Room 146
Campus

FROM: C. Michael Levy, Chair
University of Florida
Institutional Review Board

SUBJECT: **Approval of Protocol # 2002 - 124**

TITLE: Exercise and Diet Beliefs and Behaviors in Overweight Women

FUNDING: Unfunded

I am pleased to advise you that the University of Florida Institutional Review Board has recommended approval of this protocol. Based on its review, the UFIRB determined that this research presents no more than minimal risk to participants. Given your protocol, it is essential that you obtain signed documentation of informed consent from each participant. Enclosed is the dated, IRB-approved informed consent to be used when recruiting participants for the research.

If you wish to make any changes to this protocol, including the need to increase the number of participants authorized, you must disclose your plans before you implement them so that the Board can assess their impact on your protocol. In addition, you must report to the Board any unexpected complications that affect your participants.

If you have not completed this protocol by 15-Feb-2003, please telephone our office (392-0433), and we will discuss the renewal process with you.

It is important that you keep your Department Chair informed about the status of this research protocol.

CML:dl/jw

cc: Dr. Heather A. Hausenblas

Equal Opportunity/Affirmative Action Institution

APPENDIX H
CONSENT FORM FOR ELICITATION STUDY (SAMPLE 2) AND PROSPECTIVE STUDY

To: Volunteers for the Exercise and Diet Beliefs and Behaviors Study
From: Dr. Hausenblas and Rebecca Ellis Gardner, MS
RE: Informed Consent

The purpose of this statement is to summarize the study we are conducting, explain what we are asking you to do, and to assure you that all participants in the study will be assigned a coded number; individuals will not be identified by name but by the assigned code number. All data will be treated in strict confidence to the extent of the law and will be locked in a filing cabinet in the exercise psychology laboratory located in Room 145 Florida Gymnasium.

We are researchers at the University of Florida. Dr. Hausenblas is an assistant professor in Exercise Psychology and Rebecca Ellis Gardner is a Ph.D. student in Sport and Exercise Psychology. We are interested in examining your exercise and diet beliefs and behaviors. You are being asked to participate in a 4-week exercise and diet program that includes group exercise sessions that meet for 60 minutes 3 days a week and a low calorie diet that ranges from 1200-2000 calories. You will be asked to maintain daily food logs, as well as complete a series of questionnaires prior to the start of the program, at the conclusion of the program, and 1-month following the completion of the program. It is estimated that these questionnaires will take approximately 30 minutes to complete each time. Several physiological measures will also be taken before, after, and 1-month following the program (i.e., weight, body fat composition, circumference measurements, resting heart rate, blood pressure, submax VO_2, sit and reach, shoulder pat, 3 rep chest press, 3 rep leg press). The physiological measures will take approximately 60 minutes each time. You are free to discontinue your involvement in the study at any time without consequence. If at any time you do not wish to continue with the study, you will be free to withdraw from participation. There are no risks involved in participating in the study. The benefits associated with the study are a better understanding of your exercise and diet beliefs and behaviors in relation to psychological variables. You will also receive $25.00 for your participation in the research project.

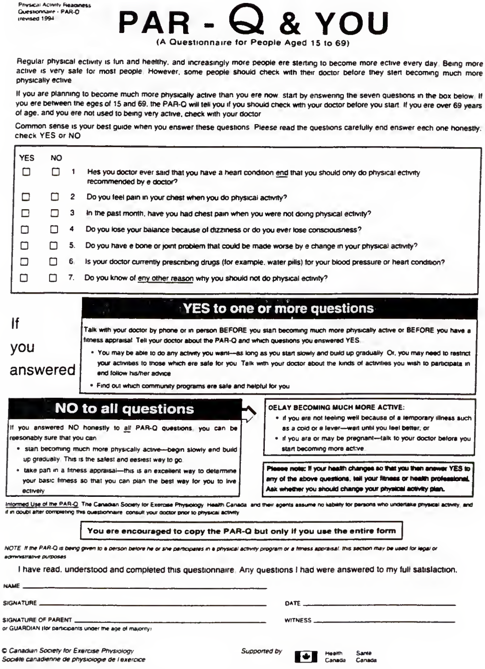
It is hoped that you will agree to take part in the study. Without the cooperation of volunteers such as you, projects of this type would not be possible. Please ask any questions you may have at this time, and if you have any additional questions or concerns during the course of the study, please contact Dr. Hausenblas (392-0584 ext. 1292). Questions or concerns about research participants' rights may be directed to the UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250 (392-0433).

If you have no further questions at this time, and if you agree to volunteer to become involved in this study, please read the following statement and sign your name in the signature blank below.

I have read the procedure above. I voluntarily agree to participate in the procedure, and I have received a copy of this description.

Participant's signature:____
Date:______________________
Principal Investigator's signature:______________________________________

APPENDIX I
PHYSICAL ACTIVITY READINESS QUESTIONNAIRE (PAR-Q)



Physical Activity Readiness
Questionnaire - PAR-Q
(revised 1994)

PAR - Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO		
☐	☐	1	Has you doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
☐	☐	2	Do you feel pain in your chest when you do physical activity?
☐	☐	3	In the past month, have you had chest pain when you were not doing physical activity?
☐	☐	4	Do you lose your balance because of dizziness or do you ever lose consciousness?
☐	☐	5.	Do you have a bone or joint problem that could be made worse by a change in your physical activity?
☐	☐	6.	Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
☐	☐	7.	Do you know of any other reason why you should not do physical activity?

If
you
answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want—as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active—begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal—this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever—wait until you feel better; or
- if you are or may be pregnant—talk to your doctor before you start becoming more active.

Please note: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

You are encouraged to copy the PAR-Q but only if you use the entire form

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction.

NAME ______________________________

SIGNATURE ______________________________ DATE ______________________

SIGNATURE OF PARENT ______________________________ WITNESS ______________________
or GUARDIAN (for participants under the age of majority)

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Société canadienne de physiologie de l'exercice

Supported by Health Canada Sante Canada

FIGURE 2-1. PAR-Q form. (Reprinted with permission from the Canadian Society for Exercise Physiology, Inc., 1994.)

APPENDIX J
ATTITUDE ITEMS

Instructions. The following questions pertain to YOUR PARTICIPATION IN THE 4-WEEK EXERCISE AND DIET PROGRAM. Choose your answer by circling the number that most appropriately answers the statement for you.

1. Attending the group *exercise* class 12 times over the next 4 weeks to lose weight will be:	Extremely Useless 1	2	3	4	5	6	Extremely Useful 7
2. Adhering to the *diet* for 28 days over the next 4 weeks to lose weight will be:	Extremely Useless 1	2	3	4	5	6	Extremely Useful 7
3. Attending the group *exercise* class 12 times over the next 4 weeks to lose weight will be:	Extremely Harmful 1	2	3	4	5	6	Extremely Beneficial 7
4. Adhering to the *diet* for 28 days over the next 4 weeks to lose weight will be:	Extremely Harmful 1	2	3	4	5	6	Extremely Beneficial 7
5. Attending the group *exercise* class 12 times over the next 4 weeks to lose weight will be:	Extremely Foolish 1	2	3	4	5	6	Extremely Wise 7
6. Adhering to the *diet* for 28 days over the next 4 weeks to lose weight will be:	Extremely Foolish 1	2	3	4	5	6	Extremely Wise 7
7. Attending the group *exercise* class 12 times over the next 4 weeks to lose weight will be:	Extremely Bad 1	2	3	4	5	6	Extremely Good 7
8. Adhering to the *diet* for 28 days over the next 4 weeks to lose weight will be:	Extremely Bad 1	2	3	4	5	6	Extremely Good 7
9. Attending the group *exercise* class 12 times over the next 4 weeks to lose weight will be:	Extremely Boring 1	2	3	4	5	6	Extremely Interesting 7
10. Adhering to the *diet* for 28 days over the next 4 weeks to lose weight will be:	Extremely Boring 1	2	3	4	5	6	Extremely Interesting 7
11. Attending the group *exercise* class 12 times over the next 4 weeks to lose weight will be:	Extremely Unpleasant 1	2	3	4	5	6	Extremely Pleasant 7
12. Adhering to the *diet* for 28 days over the next 4 weeks to lose weight will be:	Extremely Unpleasant 1	2	3	4	5	6	Extremely Pleasant 7
13. Attending the group *exercise* class 12 times over the next 4 weeks to lose weight will be:	Extremely Unenjoyable 1	2	3	4	5	6	Extremely Enjoyable 7

14. Adhering to the *diet* for 28 days over the next 4 weeks to lose weight will be:	Extremely Unenjoyable … Extremely Enjoyable 1 2 3 4 5 6 7
15. Attending the group *exercise* class 12 times over the next 4 weeks to lose weight will be:	Extremely Stressful … Extremely Relaxing 1 2 3 4 5 6 7
16. Adhering to the *diet* for 28 days over the next 4 weeks to lose weight will be:	Extremely Stressful … Extremely Relaxing 1 2 3 4 5 6 7

APPENDIX K
SUBJECTIVE NORM ITEMS

Instructions. The following questions pertain to YOUR PARTICIPATION IN THE 4-WEEK EXERCISE AND DIET PROGRAM. Choose your answer by circling the number that most appropriately answers the statement for you.

1. Most people who are important to me think I should attend the group *exercise* class 12 times over the next 4 weeks to lose weight.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
2. Most people who are important to me think I should adhere to the *diet* for 28 days over the next 4 weeks to lose weight.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
3. Most people who are important to me approve of me attending the group *exercise* class 12 times over the next 4 weeks to lose weight.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
4. Most people who are important to me approve of me adhering to the *diet* for 28 days over the next 4 weeks to lose weight.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
5. Most people who are important to me will support me attending the group *exercise* class 12 times over the next 4 weeks to lose weight.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
6. Most people who are important to me will support me adhering to the *diet* for 28 days over the next 4 weeks to lose weight.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7

APPENDIX L
PERCEIVED BEHAVIORAL CONTROL ITEMS

Instructions. The following questions pertain to YOUR PARTICIPATION IN THE 4-WEEK EXERCISE AND DIET PROGRAM. Choose your answer by circling the number that most appropriately answers the statement for you.

1. If I wanted to, I could easily attend the group *exercise* class 12 times over the next 4 weeks to lose weight.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
2. If I wanted to, I could easily adhere to the *diet* for 28 days over the next 4 weeks to lose weight.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
3. How much control do you have over attending the group *exercise* class 12 times over the next 4 weeks to lose weight?	Very Little Control 1	2	3	4	5	6	Complete Control 7
4. How much control do you have over adhering to the *diet* for 28 days over the next 4 weeks to lose weight?	Very Little Control 1	2	3	4	5	6	Complete Control 7
5. For me to attend the group *exercise* class 12 times over the next 4 weeks to lose weight will be:	Extremely Difficult 1	2	3	4	5	6	Extremely Easy 7
6. For me to adhere to the *diet* for 28 days over the next 4 weeks to lose weight will be:	Extremely Difficult 1	2	3	4	5	6	Extremely Easy 7

APPENDIX M
INTENTION ITEMS

Instructions. The following questions pertain to YOUR PARTICIPATION IN THE 4-WEEK EXERCISE AND DIET PROGRAM. Choose your answer by circling the number that most appropriately answers the statement for you.

1. To lose weight, my goal over the next 4 weeks is to attend 12 group *exercise* classes.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
2. To lose weight, my goal over the next 4 weeks is to adhere to the *diet* for 28 days.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
3. To lose weight, my goal over the next 4 weeks is to attend the group *exercise* class:	Not At All 1	2	Some Of The Time 3	4	Most Of The Time 5	6	Every Class 7
4. To lose weight, my goal over the next 4 weeks is to adhere to the *diet:*	Not At All 1	2	Some Of The Time 3	4	Most Of The Time 5	6	Everyday 7
5. To lose weight, my goal over the next 4 weeks is to attend the following number of group *exercise* classes:	0-1	2-3	4-5	6-7	8-9	10-11	12
6. To lose weight, my goal over the next 4 weeks is to adhere to the *diet* the following number of days:	0-4	5-8	9-12	13-16	17-20	21-24	25-28
Please insert a number between 0 and 12. 7. To lose weight, my goal over the next 4 weeks is to attend the group *exercise* class ________ times.							
Please insert a number between 0 and 28. 8. To lose weight, my goal over the next 4 weeks is to adhere to the *diet* ________ days.							

APPENDIX N
BEHAVIORAL BELIEFS

Instructions. The following questions pertain to your PARTICIPATION IN THE 4-WEEK EXERCISE AND DIET PROGRAM. Choose your answer by circling the number that most appropriately answers each statement for you.

1. Attending the group *exercise* class 12 times over the next 4 weeks to lose weight will help me to...

	Extremely Unlikely						**Extremely Likely**
a) improve my physical appearance.	1	2	3	4	5	6	7
b) improve my psychological well-being.	1	2	3	4	5	6	7
c) improve my fitness level.	1	2	3	4	5	6	7
d) create a healthier lifestyle.	1	2	3	4	5	6	7
e) increase my energy.	1	2	3	4	5	6	7
f) increase my motivation.	1	2	3	4	5	6	7

2. Adhering to the *diet* for 28 days over the next 4 weeks to lose weight will help me to...

	Extremely Unlikely						**Extremely Likely**
a) improve my eating habits.	1	2	3	4	5	6	7
b) improve my physical appearance.	1	2	3	4	5	6	7
c) improve my psychological well-being.	1	2	3	4	5	6	7

3. How important are each of the following outcomes for you during your exercise and diet program over the next 4 weeks?

	Extremely Unimportant						**Extremely Important**
a) improved physical appearance.	1	2	3	4	5	6	7
b) improved psychological well-being.	1	2	3	4	5	6	7
c) improved fitness level.	1	2	3	4	5	6	7
d) a healthier lifestyle.	1	2	3	4	5	6	7
e) increased energy.	1	2	3	4	5	6	7
f) increased motivation.	1	2	3	4	5	6	7
g) improved eating habits.	1	2	3	4	5	6	7

APPENDIX O
CONTROL BELIEFS

Instructions. The following questions pertain to your PARTICIPATION IN THE 4-WEEK EXERCISE AND DIET PROGRAM. Choose your answer by circling the number that most appropriately answers each statement for you.

1. How difficult will it be for you to attend the group *exercise* class 12 times over the next 4 weeks to lose weight given the following circumstances?

	Extremely Difficult						**Extremely Easy**
a) having to stick to the prearranged time for the workout.	1	2	3	4	5	6	7
b) lack of support.	1	2	3	4	5	6	7
c) experiencing physical ailments (headaches, muscle soreness, hunger).	1	2	3	4	5	6	7
d) lack of variety in the exercise activities.	1	2	3	4	5	6	7
e) having no time to exercise.	1	2	3	4	5	6	7
f) having job/school responsibilities.	1	2	3	4	5	6	7
g) having to travel.	1	2	3	4	5	6	7
h) having family responsibilities.	1	2	3	4	5	6	7
i) having no motivation to exercise.	1	2	3	4	5	6	7
j) experiencing fatigue/tiredness.	1	2	3	4	5	6	7

2. How difficult will it be for you to adhere to the *diet* for 28 days over the next 4 weeks to lose weight given the following circumstances?

	Extremely Difficult						**Extremely Easy**
a) inconvenience of following the diet within your normal routine.	1	2	3	4	5	6	7
b) experiencing physical ailments (hunger, headaches, tiredness)	1	2	3	4	5	6	7
c) lack of variety in food choices.	1	2	3	4	5	6	7
d) lack of freedom to eat out.	1	2	3	4	5	6	7
e) lack of freedom to eat your favorite foods.	1	2	3	4	5	6	7
f) having temptations to eat foods not included in the diet.	1	2	3	4	5	6	7
g) having to attend social situations that involve food.	1	2	3	4	5	6	7
h) dissatisfaction with the food.	1	2	3	4	5	6	7
i) having job responsibilities.	1	2	3	4	5	6	7
j) experiencing mood disturbances.	1	2	3	4	5	6	7
k) having little time to eat, record, and prepare the foods included in the diet.	1	2	3	4	5	6	7

3. How strongly will each item influence you attending the group *exercise* class 12 times over the next 4 weeks to lose weight?

	Extremely Weak						Extremely Strong
a) having to stick to the prearranged time for the workout.	1	2	3	4	5	6	7
b) lack of support.	1	2	3	4	5	6	7
c) experiencing physical ailments (headaches, muscle soreness, hunger).	1	2	3	4	5	6	7
d) lack of variety in the exercise activities.	1	2	3	4	5	6	7
e) having no time to exercise.	1	2	3	4	5	6	7
f) having job/school responsibilities.	1	2	3	4	5	6	7
g) having to travel.	1	2	3	4	5	6	7
h) having family responsibilities.	1	2	3	4	5	6	7
i) having no motivation to exercise.	1	2	3	4	5	6	7
j) experiencing fatigue/tiredness.	1	2	3	4	5	6	7

4. How strongly will each item influence you adhering to the *diet* for 28 days over the next 4 weeks to lose weight given the following circumstances?

	Extremely Weak						Extremely Strong
a) inconvenience of following the diet within your normal routine.	1	2	3	4	5	6	7
b) experiencing physical ailments (hunger, headaches, tiredness).	1	2	3	4	5	6	7
c) lack of variety in food choices.	1	2	3	4	5	6	7
d) lack of freedom to eat out.	1	2	3	4	5	6	7
e) lack of freedom to eat your favorite foods.	1	2	3	4	5	6	7
f) having temptations to eat foods not included in the diet.	1	2	3	4	5	6	7
g) having to attend social situations that involve food.	1	2	3	4	5	6	7
h) dissatisfaction with the food.	1	2	3	4	5	6	7
i) having job responsibilities.	1	2	3	4	5	6	7
j) experiencing mood disturbances.	1	2	3	4	5	6	7
k) having little time to eat, record, and prepare the foods included in the diet.	1	2	3	4	5	6	7

APPENDIX P
NORMATIVE BELIEFS

Instructions. The following questions pertain to your PARTICIPATION IN THE 4-WEEK EXERCISE AND DIET PROGRAM. Choose your answer by circling the number that most appropriately answers each statement for you.

1. How strongly will each of the following people approve or disapprove of you attending the group *exercise* class 12 times over the next 4 weeks to lose weight?

	Strongly Disapprove						**Strongly Approve**
a) the program trainers.	1	2	3	4	5	6	7
b) family.	1	2	3	4	5	6	7
c) friends.	1	2	3	4	5	6	7
d) group members.	1	2	3	4	5	6	7
e) spouse or significant other.	1	2	3	4	5	6	7

2. How strongly will each of the following people approve or disapprove of you adhering to the *diet* for 28 days over the next 4 weeks to lose weight?

	Strongly Disapprove						**Strongly Approve**
a) the program trainers.	1	2	3	4	5	6	7
b) family.	1	2	3	4	5	6	7
c) friends.	1	2	3	4	5	6	7
d) group members.	1	2	3	4	5	6	7
e) spouse or significant other.	1	2	3	4	5	6	7

3. How important is it for you to do what each of these people approve of during the exercise and diet program over the next 4 weeks?

	Extremely Unimportant						**Extremely Important**
a) the program trainers.	1	2	3	4	5	6	7
b) family.	1	2	3	4	5	6	7
c) friends.	1	2	3	4	5	6	7
d) group members.	1	2	3	4	5	6	7
e) spouse or significant other.	1	2	3	4	5	6	7

APPENDIX Q
EXERCISE ATTENDANCE LOG

NAME	1	2	3	4	5	6	7	8	9	10	11	12

APPENDIX R
DIET FOOD LOGS

MENU DAY 1

Participant ID# (Last 4 Digits of SS #)__________ Date __________

FOOD	TIME	SUBSTITUTIONS	FEELINGS
Meal 1: • 1 English muffin ☐ • 1 serving fruit ☐ • 1 scrambled egg ☐ • 1 tbsp low-fat margarine or 1 tsp oil (canola, olive, peanut, vegetable) ☐		• • • •	
Meal 2: • 1 serving nonfat fruit flavored yogurt ☐ • ¼-cup low-fat granola ☐ (Mix granola in the yogurt)		• •	
Meal 3: • 2 slices (2 oz) whole wheat bread ☐ • 2 oz white meat no-skin chicken or turkey • 1 tbsp reduced fat mayonnaise ☐ • Can add lettuce, tomato, etc ☐ • Can add mustard ☐ • Can add 1 cup raw vegetables		• • • • • •	
Meal 4: • 1 cup raw vegetables ☐ • 1 oz low-fat cheese ☐		• •	
Meal 5: • 1 medium (6 oz) baked potato ☐ • 1 tbsp fat-free sour cream ☐ • 1 small salad (1.5 cup lettuce) with choice of vegetable toppings (1/2-cup raw) ☐ • 2 tbsp reduced-fat salad dressing ☐ • 3 oz very lean meat ☐		• • • • •	
Meal 6: • 1 small (4 oz) banana ☐ • 1 tbsp peanut butter ☐ • ¼ -cup of low fat granola ☐ (Put peanut butter on banana and roll in granola or grape nuts)		• • •	

Total Water Intake __________ cups or ounces (circle one**)**

MENU DAY 2

Participant ID# (Last 4 Digits of SS #)__________ Date __________

FOOD	TIME	SUBSTITUTIONS	FEELINGS
Meal 1: • ½-cup low-fat granola or ½ cup Grape Nuts cereal ☐ • ½-cup 1% milk ☐ • 1 serving of fruit ☐		• • •	
Meal 2: • 1 low-fat granola bar ☐		•	
Meal 3: • 2 slices (2 oz) whole wheat bread ☐ • 2 oz (canned in oil, drained) tuna ☐ • 1 tbsp reduced-fat mayonnaise ☐ • Can add lettuce, tomato, etc. ☐ • Can add mustard ☐ • Can add 1-2 tbsp pickle relish ☐ • 1 cup raw vegetables ☐		• • • • • • •	
Meal 4: • 1 6-inch across flour or corn tortilla ☐ • 1 oz mozzarella cheese ☐ • 1 serving fruit ☐ • Can add ¼ -cup salsa ☐ (Melt cheese on tortilla)		• • • •	
Meal 5: • 3 oz very lean meat ☐ • 1-cup cooked vegetables ☐ • Small (1 oz) whole wheat roll ☐ • 1 tbsp low-fat margarine ☐		• • • •	
Meal 6: • 1 serving fruit flavored yogurt ☐ • 1 oz pretzels ☐		• •	

Total Water Intake __________ cups or ounces (circle one)

MENU DAY 3

Participant ID# (Last 4 Digits of SS #)__________ Date __________

FOOD	TIME	SUBSTITUTIONS	FEELINGS
Meal 1: • 2/3-cup frozen strawberries ☐ • 1 small (4 oz) banana ☐ • ½ -cup orange juice ☐ • ½-cup plain reduced-fat yogurt ☐ • 1 package of sugar substitute ☐ (Blend all above ingredients with ice)		• • • • •	
Meal 2: • 1 slice (1 oz) whole wheat bread ☐ • 1 tbsp peanut butter ☐		• •	
Meal 3: • 1 English Muffin ☐ • ¼ -cup Ragu pizza sauce ☐ • 1.5 oz mozzarella cheese ☐ • Can add vegetable toppings ☐ (Half English muffin, top with sauce, cheese, and toppings and bake until cheese is melted, etc.)		• • • •	
Meal 4: • 1 cup raw vegetables ☐ • ½ -cup low-fat cottage cheese ☐		• •	
Meal 5: • 3 oz very lean meat ☐ • 4 tbsp (1/4 cup) reduced-fat salad dressing ☐ (Marinate meat in salad dressing) • 1 cup of cooked peppers (red, yellow, green), onion, and others ☐ (Use nonstick cooking spray to first cook meat, then stir-fry vegetables) • 1/4 cup cooked brown rice ☐		• • • •	
Meal 6: • 1 serving fruit ☐ • ½-cup low-fat frozen yogurt ☐		• •	

Total Water Intake __________ cups or ounces (circle one)

MENU DAY 4

Participant ID# (Last 4 Digits of SS #)__________ Date __________

FOOD	TIME	SUBSTITUTIONS	FEELINGS
Meal 1: • ½ -cup low-fat cottage cheese ☐ • ¼ -cup low-fat granola ☐ • 1 serving fruit (Mix above ingredients together in a bowl)		• • •	
Meal 2: • 2 low-fat granola bars ☐		•	
Meal 3: • 2 slices (2 oz) whole wheat bread ☐ • 2 oz white meat no-skin chicken or turkey ☐ • 1 tbsp reduced fat mayonnaise ☐ • Can add lettuce, tomato, etc. ☐ • Can add mustard ☐ • 1 cup raw vegetables		• • • • •	
Meal 4: • 1 serving nonfat fruit flavored yogurt ☐		•	
Meal 5: • ½ -cup cooked black beans ☐ • ¼- cup cooked brown rice ☐ • Top with ½-cup raw vegetables (tomatoes, peppers, or onions are good) ☐ • 1 oz cheddar cheese ☐ (Cook beans separately from rice. Top rice with beans, vegetables, and cheese) • Small salad (1 cup lettuce, ½-cup raw vegetables) ☐ • 2 tbsp reduced-fat salad dressing ☐		• • • • • •	
Meal 6: • 1 serving fruit ☐ • 1 oz low-fat cheese ☐		• •	

Total Water Intake __________ cups or ounces (circle one)

MENU DAY 5

Participant ID# (Last 4 Digits of SS #)__________ Date __________

FOOD	TIME	SUBSTITUTIONS	FEELINGS
Meal 1: • 2 fat-free 4.5 inch square waffles ☐ • 2 tbsp light syrup ☐		• •	
Meal 2: • 1 serving fruit ☐ • 1 oz low-fat cheese ☐		• •	
Meal 3: • 2 slices (2 oz) whole wheat bread ☐ • 2 oz (canned in oil, drained) tuna ☐ • 1 tbsp reduced-fat mayo ☐ • Can add lettuce, tomato, etc. ☐ • Can add mustard ☐ • 1 cup raw vegetables ☐		• • • • • •	
Meal 4: • 2 low-fat granola bars ☐		•	
Meal 5: • 3 oz white meat, no-skin chicken ☐ • 2 tsp vegetable oil ☐ (Cook chicken in oil) • ½ -cup spaghetti or pasta sauce ☐ • 2 oz uncooked pasta ☐ (Cook pasta according to package and top with chicken and sauce.) • 1 small salad (1.5 cup lettuce) with choice of vegetable toppings (1/2-cup raw) ☐ • 2 tbsp reduced-fat salad dressing ☐		• • • • • •	
Meal 6: • 1 serving fruit ☐ • ½-cup plain reduced-fat yogurt ☐ (Mix fruit in yogurt)		• •	

Total Water Intake __________ cups or ounces (circle one)

MENU DAY 6

Participant ID# (Last 4 Digits of SS #)__________ Date __________

FOOD	TIME	SUBSTITUTIONS	FEELINGS
Meal 1: • 4 egg whites ☐ • 2 tsp vegetable oil ☐ • 1 cup raw vegetables ☐ • 1 flour tortilla ☐ (Cook egg whites in oil, sprinkle in vegetables to make an omelet or scrambled, wrap in tortilla for a breakfast burrito) • ½-cup orange juice ☐		• • • • •	
Meal 2: • 1 serving fruit ☐ • 1 low-fat granola bar ☐		• •	
Meal 3: • 1.5 cups lettuce & ½-cup raw vegetables ☐ • 2 oz white meat, no-skin chicken or turkey ☐ • 2 tbsp reduced-fat salad dressing ☐ (Toss meat on top of salad for a chef salad) • 1 slice (1 oz) whole wheat toast ☐ • 1 serving nonfat fruit flavored yogurt ☐		• • • • •	
Meal 4: • 1 serving fruit ☐ • 1 oz low-fat cheese ☐		• •	
Meal 5: • 1 English Muffin ☐ • ¼ -cup Ragu pizza sauce ☐ • 1.5 oz mozzarella cheese ☐ • Can add vegetable toppings ☐ (Half English muffin, top with sauce, cheese, and toppings and bake until cheese is melted, etc.)		• • • •	
Meal 6: • ½-cup low-fat cottage cheese ☐ • ¼-cup low-fat granola ☐ (Mix granola in cottage cheese)		• •	

Total Water Intake __________ cups or ounces (circle one)

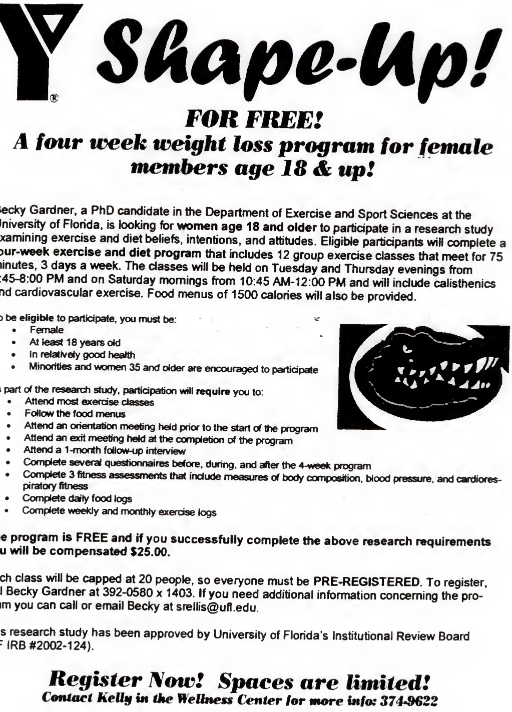
MENU DAY 7

Participant ID# (Last 4 Digits of SS #)__________ Date __________

FOOD	TIME	SUBSTITUTIONS	FEELINGS
Meal 1: • ½-cup low-fat granola or ½ cup Grape Nuts cereal ☐ • ½-cup 1% milk ☐ • 1 serving of fruit ☐		• • •	
Meal 2: • 1 serving fruit ☐ • 1 oz pretzels ☐		• •	
Meal 3: • 2 slices (2 oz) whole wheat bread ☐ • 2 oz white meat no-skin chicken or turkey ☐ • 1 tbsp reduced fat mayonnaise ☐ • Can add lettuce, tomato, etc. ☐ • Can add mustard ☐ • 1 cup raw vegetables		• • • • • •	
Meal 4: • 1 6-inch across flour or corn tortilla ☐ • 1 oz mozzarella cheese ☐ • Can add ¼ -cup salsa ☐ (Melt cheese on tortilla)		• • •	
Meal 5: • 1 slice (1 oz) whole wheat toast ☐ • 1 small salad (1.5 cup lettuce) with choice of vegetable toppings (1/2-cup raw) ☐ • 2 tbsp reduced-fat salad dressing ☐ • 3 oz very lean meat ☐		• • • •	
Meal 6: • 1 serving fruit ☐ • ½-cup low-fat frozen yogurt ☐		• •	

Total Water Intake __________ cups or ounces (circle one)

APPENDIX S
YMCA ADVERTISEMENT



Shape-Up!

FOR FREE!

A four week weight loss program for female members age 18 & up!

Becky Gardner, a PhD candidate in the Department of Exercise and Sport Sciences at the University of Florida, is looking for **women age 18 and older** to participate in a research study examining exercise and diet beliefs, intentions, and attitudes. Eligible participants will complete a **four-week exercise and diet program** that includes 12 group exercise classes that meet for 75 minutes, 3 days a week. The classes will be held on Tuesday and Thursday evenings from 6:45-8:00 PM and on Saturday mornings from 10:45 AM-12:00 PM and will include calisthenics and cardiovascular exercise. Food menus of 1500 calories will also be provided.

To be **eligible** to participate, you must be:

- Female
- At least 18 years old
- In relatively good health
- Minorities and women 35 and older are encouraged to participate

As part of the research study, participation will **require** you to:

- Attend most exercise classes
- Follow the food menus
- Attend an orientation meeting held prior to the start of the program
- Attend an exit meeting held at the completion of the program
- Attend a 1-month follow-up interview
- Complete several questionnaires before, during, and after the 4-week program
- Complete 3 fitness assessments that include measures of body composition, blood pressure, and cardiorespiratory fitness
- Complete daily food logs
- Complete weekly and monthly exercise logs

The program is FREE and if you successfully complete the above research requirements you will be compensated $25.00.

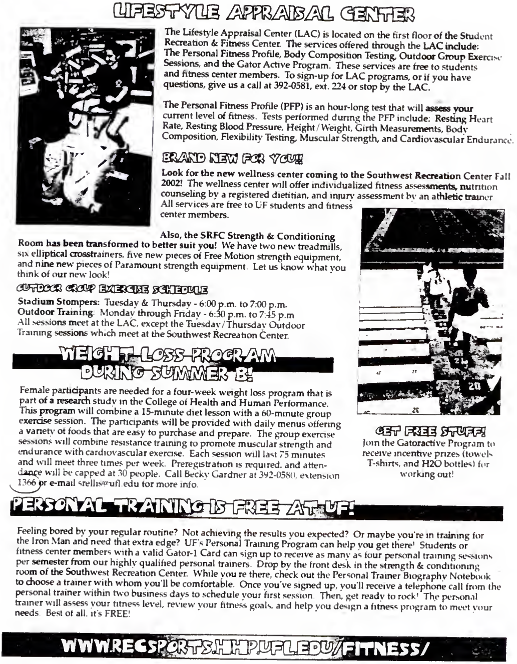
Each class will be capped at 20 people, so everyone must be PRE-REGISTERED. To register, call Becky Gardner at 392-0580 x 1403. If you need additional information concerning the program you can call or email Becky at srellis@ufl.edu.

This research study has been approved by University of Florida's Institutional Review Board (UF IRB #2002-124).

Register Now! Spaces are limited!

Contact Kelly in the Wellness Center for more info: 374-9622

APPENDIX T
SRFC SUMMER SEMESTER ADVERTISEMENT



LIFESTYLE APPRAISAL CENTER

The Lifestyle Appraisal Center (LAC) is located on the first floor of the Student Recreation & Fitness Center. The services offered through the LAC include: The Personal Fitness Profile, Body Composition Testing, Outdoor Group Exercise Sessions, and the Gator Active Program. These services are free to students and fitness center members. To sign-up for LAC programs, or if you have questions, give us a call at 392-0581, ext. 224 or stop by the LAC.

The Personal Fitness Profile (PFP) is an hour-long test that will assess your current level of fitness. Tests performed during the PFP include: Resting Heart Rate, Resting Blood Pressure, Height / Weight, Girth Measurements, Body Composition, Flexibility Testing, Muscular Strength, and Cardiovascular Endurance.

BRAND NEW FOR YOU!

Look for the new wellness center coming to the Southwest Recreation Center Fall 2002! The wellness center will offer individualized fitness assessments, nutrition counseling by a registered dietitian, and injury assessment by an athletic trainer. All services are free to UF students and fitness center members.

Also, the SRFC Strength & Conditioning Room has been transformed to better suit you! We have two new treadmills, six elliptical crosstrainers, five new pieces of Free Motion strength equipment, and nine new pieces of Paramount strength equipment. Let us know what you think of our new look!

OUTDOOR GROUP EXERCISE SCHEDULE

Stadium Stompers: Tuesday & Thursday - 6:00 p.m. to 7:00 p.m.
Outdoor Training: Monday through Friday - 6:30 p.m. to 7:45 p.m.
All sessions meet at the LAC, except the Tuesday / Thursday Outdoor Training sessions which meet at the Southwest Recreation Center.

WEIGHT LOSS PROGRAM DURING SUMMER B!

Female participants are needed for a four-week weight loss program that is part of a research study in the College of Health and Human Performance. This program will combine a 15-minute diet lesson with a 60-minute group exercise session. The participants will be provided with daily menus offering a variety of foods that are easy to purchase and prepare. The group exercise sessions will combine resistance training to promote muscular strength and endurance with cardiovascular exercise. Each session will last 75 minutes and will meet three times per week. Preregistration is required, and attendance will be capped at 30 people. Call Becky Gardner at 392-0580, extension 1366 or e-mail srellis@ufl.edu for more info.

GET FREE STUFF!

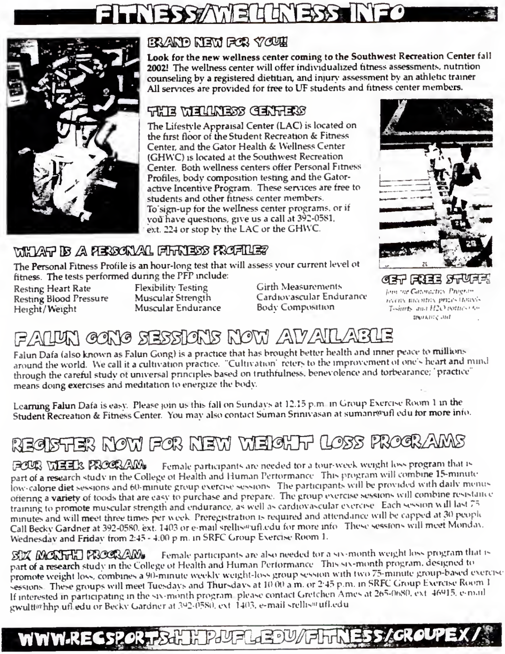
Join the Gatoractive Program to receive incentive prizes (towels, T-shirts, and H2O bottles) for working out!

PERSONAL TRAINING IS FREE AT UF!

Feeling bored by your regular routine? Not achieving the results you expected? Or maybe you're in training for the Iron Man and need that extra edge? UF's Personal Training Program can help you get there! Students or fitness center members with a valid Gator-1 Card can sign up to receive as many as four personal training sessions per semester from our highly qualified personal trainers. Drop by the front desk in the strength & conditioning room of the Southwest Recreation Center. While you're there, check out the Personal Trainer Biography Notebook to choose a trainer with whom you'll be comfortable. Once you've signed up, you'll receive a telephone call from the personal trainer within two business days to schedule your first session. Then, get ready to rock! The personal trainer will assess your fitness level, review your fitness goals, and help you design a fitness program to meet your needs. Best of all, it's FREE!

WWW.RECSPORTS.HHP.UFL.EDU/FITNESS/

APPENDIX U
SRFC FALL SEMESTER ADVERTISEMENT



FITNESS/WELLNESS INFO

BRAND NEW FOR YOU!

Look for the new wellness center coming to the Southwest Recreation Center fall 2002! The wellness center will offer individualized fitness assessments, nutrition counseling by a registered dietitian, and injury assessment by an athletic trainer All services are provided for free to UF students and fitness center members.

THE WELLNESS CENTERS

The Lifestyle Appraisal Center (LAC) is located on the first floor of the Student Recreation & Fitness Center, and the Gator Health & Wellness Center (GHWC) is located at the Southwest Recreation Center. Both wellness centers offer Personal Fitness Profiles, body composition testing and the Gator-active Incentive Program. These services are free to students and other fitness center members.
To sign-up for the wellness center programs, or if you have questions, give us a call at 392-0581, ext. 224 or stop by the LAC or the GHWC.

WHAT IS A PERSONAL FITNESS PROFILE?

The Personal Fitness Profile is an hour-long test that will assess your current level of fitness. The tests performed during the PFP include:

- Resting Heart Rate
- Resting Blood Pressure
- Height/Weight
- Flexibility Testing
- Muscular Strength
- Muscular Endurance
- Girth Measurements
- Cardiovascular Endurance
- Body Composition

GET FREE STUFF!

Join the Gatoractive Program receive incentive prizes (towels, T-shirts, and H2O bottles) for working out

FALUN GONG SESSIONS NOW AVAILABLE

Falun Dafa (also known as Falun Gong) is a practice that has brought better health and inner peace to millions around the world. We call it a cultivation practice. "Cultivation" refers to the improvement of one's heart and mind through the careful study of universal principles based on truthfulness, benevolence and forbearance; "practice" means doing exercises and meditation to energize the body.

Learning Falun Dafa is easy. Please join us this fall on Sundays at 12:15 p.m. in Group Exercise Room 1 in the Student Recreation & Fitness Center. You may also contact Suman Srinivasan at sumanr@ufl.edu for more info.

REGISTER NOW FOR NEW WEIGHT LOSS PROGRAMS

FOUR WEEK PROGRAM. Female participants are needed for a four-week weight loss program that is part of a research study in the College of Health and Human Performance. This program will combine 15-minute low-calorie diet sessions and 60-minute group exercise sessions. The participants will be provided with daily menus offering a variety of foods that are easy to purchase and prepare. The group exercise sessions will combine resistance training to promote muscular strength and endurance, as well as cardiovascular exercise. Each session will last 75 minutes and will meet three times per week. Preregistration is required and attendance will be capped at 30 people. Call Becky Gardner at 392-0580, ext. 1403 or e-mail srellis@ufl.edu for more info. These sessions will meet Monday, Wednesday and Friday from 2:45 - 4:00 p.m. in SRFC Group Exercise Room 1.

SIX MONTH PROGRAM. Female participants are also needed for a six-month weight loss program that is part of a research study in the College of Health and Human Performance. This six-month program, designed to promote weight loss, combines a 90-minute weekly weight-loss group session with two 75-minute group-based exercise sessions. These groups will meet Tuesdays and Thursdays at 10:00 a.m. or 2:45 p.m. in SRFC Group Exercise Room 1. If interested in participating in the six-month program, please contact Gretchen Ames at 265-0680, ext. 46915, e-mail gwultt@hhp.ufl.edu or Becky Gardner at 392-0580, ext. 1403, e-mail srellis@ufl.edu

WWW.RECSPORTS.HHP.UFL.EDU/FITNESS/GROUPEX/

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BIOGRAPHICAL SKETCH

I, Rebecca Ellis Gardner, was born on December 10, 1974 in Atlanta, Georgia. I received my Bachelor of Arts degree with a double major in psychology and sociology from Oglethorpe University in Atlanta, Georgia, during the spring of 1997. In the fall of 1997, I was accepted to the graduate program at the University of Florida and received my Master of Science in Exercise and Sport Sciences during the summer of 1999. I remained at the University of Florida to pursue my Doctor of Philosophy degree with a specialization in sport and exercise psychology. In the summer of 2003, I will be graduating from the University of Florida, and my son Clayton, my husband Chris, and I will be moving to Baton Rouge, Louisiana. I will begin a tenure-track position in health promotion in the Department of Kinesiology at Louisiana State University.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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